nts—p. 57
Solidification Rates—p. 62
s From Plant Lighting—p. 68
le Wire Rolls—p. 74
rn Paint Removers—p. 78
6 Million Tons Needed—p. 113
acklogs Artificially Low—p. 119
Men Sigh for Steel—p. 123

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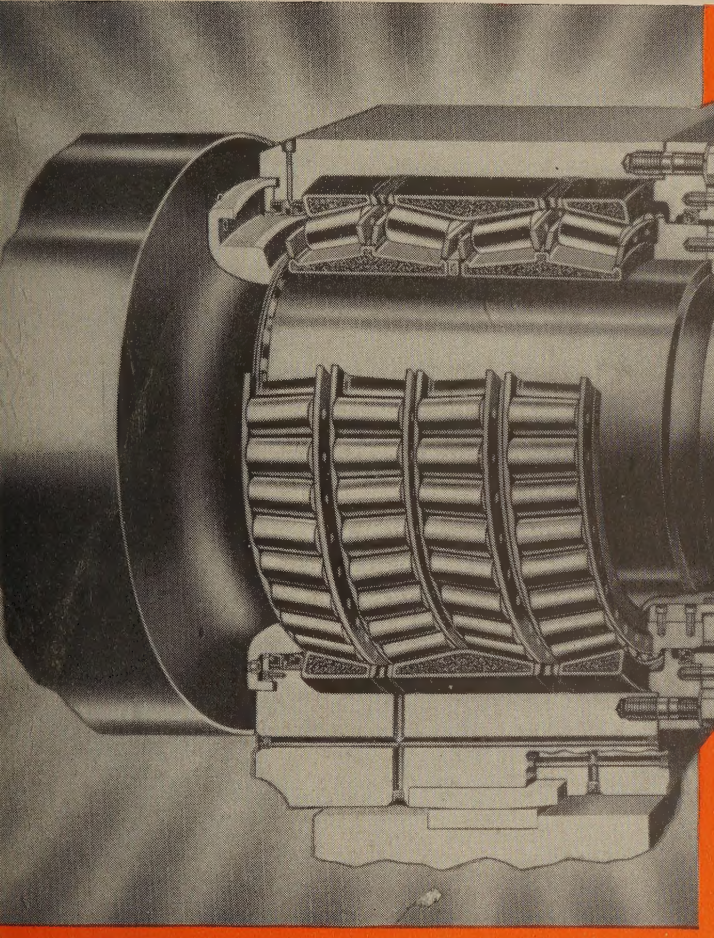
The
IRON AGE
OCTOBER 9, 1947



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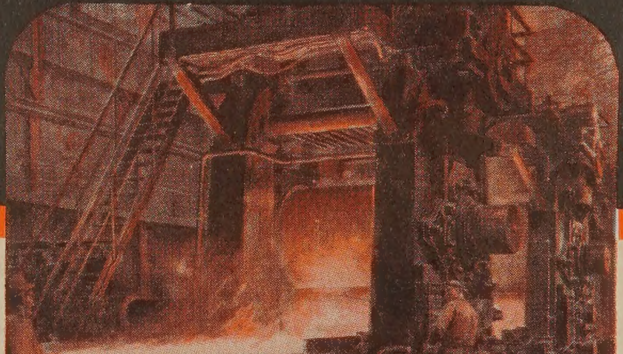

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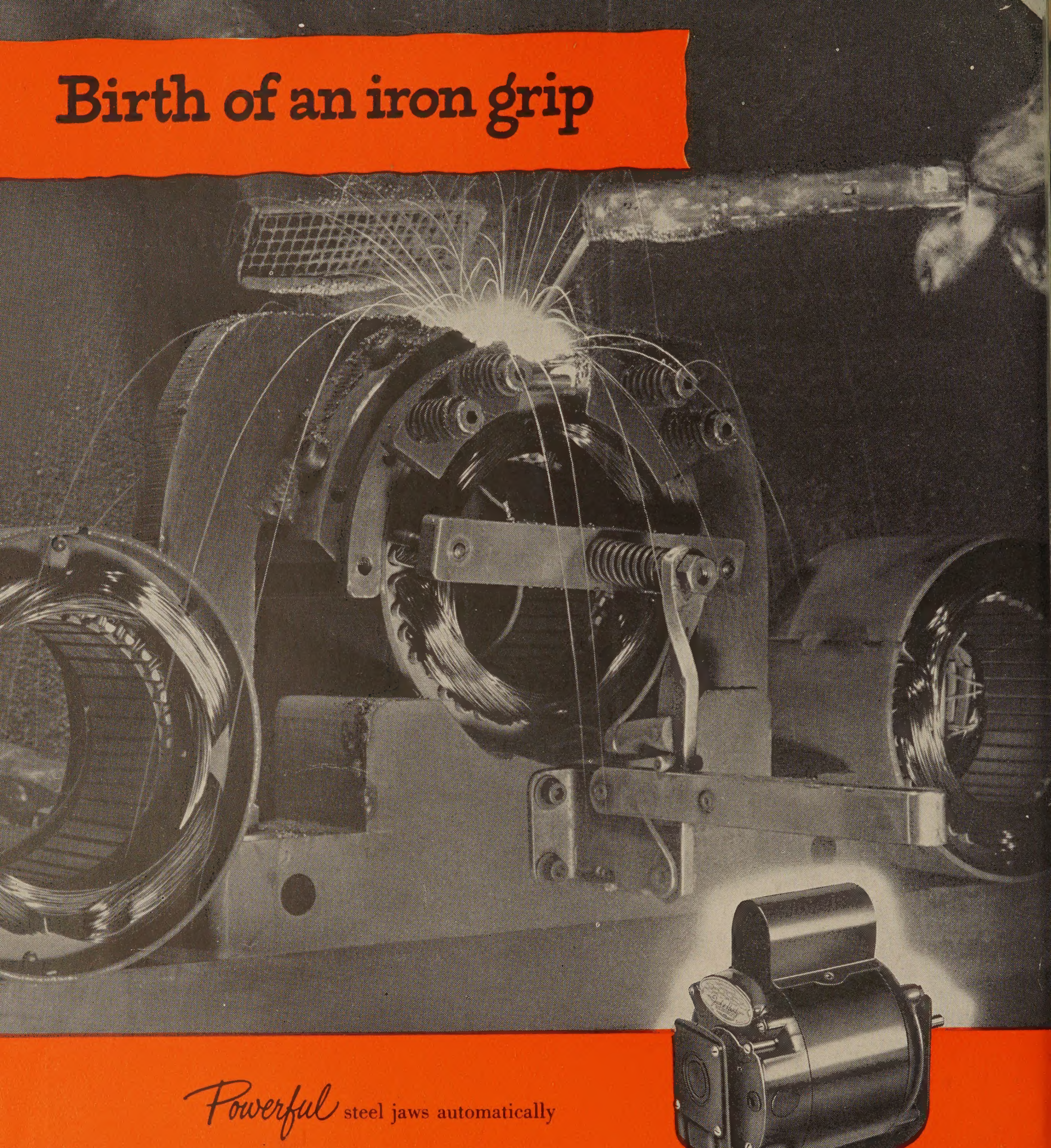

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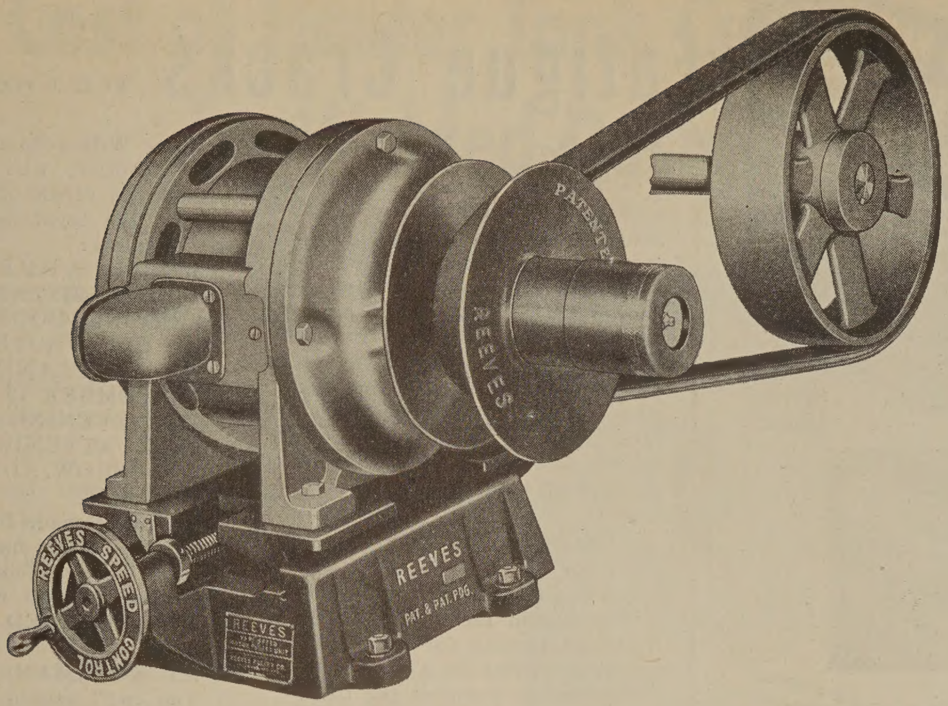

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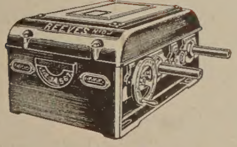

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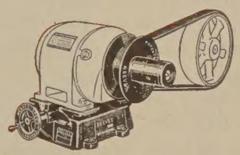

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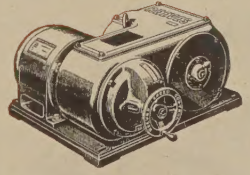

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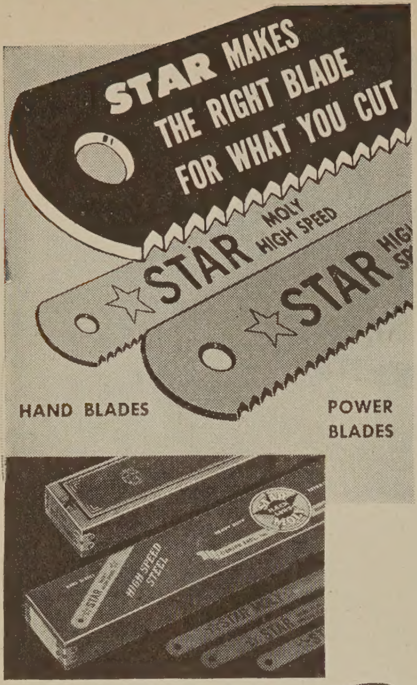

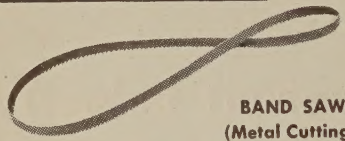

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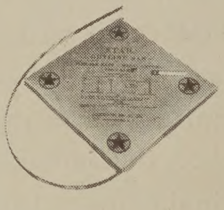

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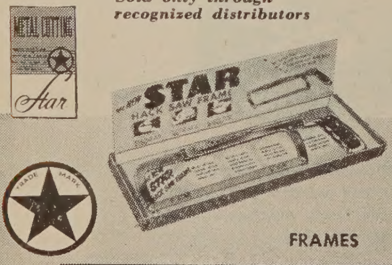


FRAMES

CLEMSON

CLEMSON BROS., Inc., Middletown, N. Y.
Makers of hand and power hack saw blades frames metal cutting band saw blades and the Clemson D-17 lawn machine

Fatigue Cracks

BY C. T. POST

It Ain't So

• • The automobile industry, as a whole, has been most understanding during the steel shortage, swinging its blows at the steelmakers from no lower than the floor. Tactics of the automotive unions have been a little rougher. But it took an automotive trade paper to level a real haymaker which glanced off and hit your favorite family journal right in the snoot. *Autonews*, a Los Angeles sheet, had this to say the other day:

> *"The professional apologizers for the steel industry are rubbing soot over their crystal balls again.* IRON AGE, *unofficial spokesman for the industry, is mailed in a cellophane wrapper to preserve the tears shed on its pages by its editorial staff."*

Come on boys, roll up your sleeves. Geronimo!

Incidental Statistics

• • The little man with a calculating machine you saw sneaking around the Machine Tool Show whispered in our ear that the total horsepower of motors used to run the mass of equipment there totaled 25,000 hp. Therefore, we weren't surprised a bit to hear that the total attendance at the show was 150,000. On page 789 of our Handbook, we recall that Man, considered as a machine, is rated at 1/6 hp. It works out: 1/6 x 150,000 = 25,000. We're just waiting for some economist to come up with the idea that if all the visitors at the show had been put to work, none of the motors would have been needed. Anyhow, from the accountants' point of view, the books are in balance.

Service With A Smile

• • Some of the massive machinery on display at the Show, performing 15 or 20 operations automatically, could have taken the blue ribbon at magicians' convention. But the most amazing part of the whole business was how 150,000 people seemed to be adequately housed even though it had been announced only 14,000 hotel rooms would be available. For sheer legerdemain, though, we'll stack up the job done by D. I. Brown, Chicago editor, against any automatic transfer machine built. The day before the show opened came the following frantic wire from a Wilkes-Barre metal-working executive, who claimed relationship by virtue of being a member of the loyal family of IRON AGE readers:

> WOULD APPRECIATE YOUR ASSISTANCE IN RESERVING DOUBLE ROOM AT GOOD HOTEL. ARRIVING VIA PLANE EVENING SEPTEMBER 19 STAY UNTIL EVENING SEPT 21 PLAN ATTEND MACHINE TOOL SHOW. ADVISE WIRE COLLECT.

For the Reader Service Department, that would have been tough. But the Chicago lobe of the brains department wired right back:

> TWIN BEDDED ROOM RESERVED IN YOUR NAME AT SHERMAN HOTEL.

You can't stump these editors!

Don't Write

• • We asked an 86-yr old Western Union boy this morning why it was that even the most fluent and articulate individuals suddenly drop the pebble from the mouth when they sit down to compose a telegram—and forget about punctuation altogether. Witness the following wire received by the Chicago office from one of the top men in the editorial wing:

> LLOYD ARRIVES TOMORROW TUESDAY MAY BE CIRCULATION MAN NEEDING ROOM SHERMAN HE CAN SHARE ONE OF THE TWO WE HAVE

The W.U. boy told us on the side that the telegraph company rather encourages these things, because it usually takes two or three wires each way to straighten them out. Some firms simply hire a telegraphic interpreter.

Boom or Bust

• • Bill Sherman of the Automobile Manufacturers Association calls our attention to this item in the Chicago Daily News:

> *"Some student claims to have discovered a correlation between prosperity and women's skirts. Buy when the hemline's high, he says; and duck for the cyclone cellar when it's low. Depression and invisible ankles go together."*

We knew all the time there was something foreboding about these new fashions. We're going out to our favorite oak tree and store acorns right now.

(Advertisement)

Cost of Heater Tank Cut 25% by Welded Design

BY C. E. PULLUM,
VICE PRESIDENT IN CHARGE OF PRODUCTION
BELL & GOSSETT CO., MORTON GROVE, ILL.

One of the principal parts of the domestic hot water system manufactured by our company is the tank shown in Fig. 1. We formerly purchased this tank . . . the design shown at the right . . . from an outside source. Difficulty in getting deliveries led us to redesign it for arc welded steel construction and fabricate it ourselves. The welded design is shown on the left in Fig. 1.

The former casting weighed 90 lbs. The welded tank weighs only 40 lbs.; hence, is easier to handle and install. Reduction in cost of the tank only (exclusive of coils and fittings) has been about 25%.

SIMPLIFIES PRODUCTION

Procedure for making the welded tank, which is 29½″ high and 7⅝″ in diameter, is very simple. The tank shell is a sheet of 10-gauge steel which is rolled and then butt-welded with one pass of "Fleetweld 5" electrode, 3/16-inch size.

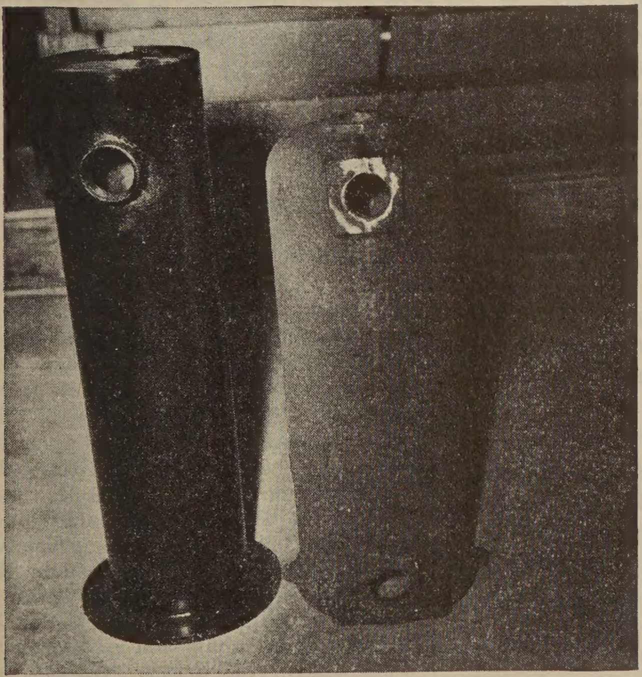


Fig. 1. Tank of new welded design (left) and former design. Changeover to welded construction improved the tank and cut its cost 25%.

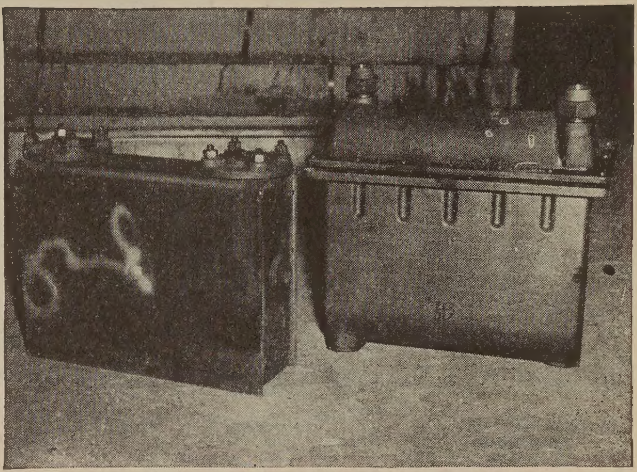


Fig. 2. Tankless heater of welded construction (left) costs about 25% less than the previous construction (right): Its size and weight also have been reduced.

Bottom flange of the welded tank is a ⅜″ plate, cut to 10½″ diameter. A piece 7⅝″ in diameter is cut from the center of this plate and used for the top of the tank. This top plate is cut out with a 5-degree bevel to obtain 100% penetration when it is welded. It is pressed into the top of the tank and welded with one pass of "Fleetweld 5," ¼-inch size. The bottom flange is fillet-welded with the same electrode and a pipe connection welded in as shown.

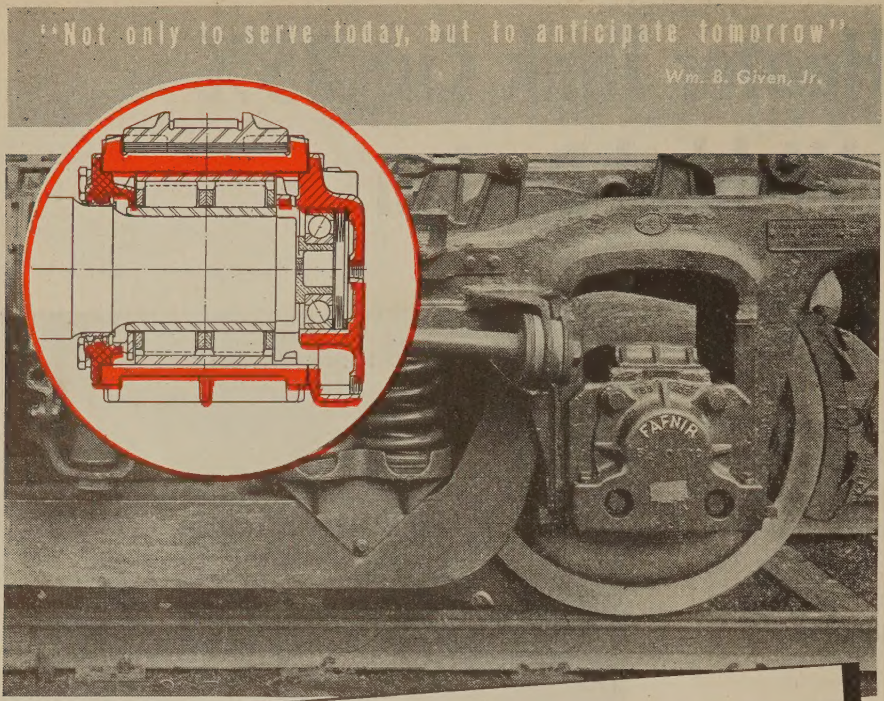
TANKLESS HEATER ALSO REDESIGNED

Another unit which has been changed over to welded design is a tankless heater. Fig. 2 shows the new welded design (left) and the tank of former construction. Its size, weight and cost have been reduced. Formerly it weighed 105 pounds and was 20″ x 17″ x 6″, exclusive of flange. The welded design weighs 84 pounds and measures 18″ x 14″ x 6″. Cost savings are about 25%.

This tankless heater is fabricated from two pieces of brake-formed 3/16″ plate and is fillet-welded with "Fleetweld 5," ¼-inch size.

In exploring for savings with arc welding, we have found it wise to change over one part at a time rather than try to redesign the entire product at once.

The above is published by LINCOLN ELECTRIC in the interests of progress.
Machine Design Sheets are obtainable by writing The Lincoln Electric Company, Dept. 148, Cleveland 1, Ohio.



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The selection of these castings provides two-in-one protection. In the first place, the Meehanite metal assures the high strength and vibration dampening that the high speed mainline operation requires, without sacrificing ready machinability. In the second place, the extensive experience of American Brake Shoe Company provides a knowledge of foundry techniques added to the services of consulting metallurgists and engineers. Thus the right metal and the right manufacturing methods assure castings that stand up in severe service.

Brake Shoe's metallurgical department includes an experimental foundry completely equipped for pilot plant work. Brake Shoe maintains foundries at Mahwah, N. J., Melrose Park, Ill., and Baltimore, Md. with facilities for producing widely used types of castings (light or heavy weight, green or dry sand or all core assemblies) including intricate and special types. Write us about your castings needs. We'll tell you promptly what we can do to help you.

AMERICAN Brake Shoe COMPANY

BRAKE SHOE AND CASTINGS DIVISION
230 PARK AVENUE, NEW YORK 17, N. Y.

5278

Dear Editor:

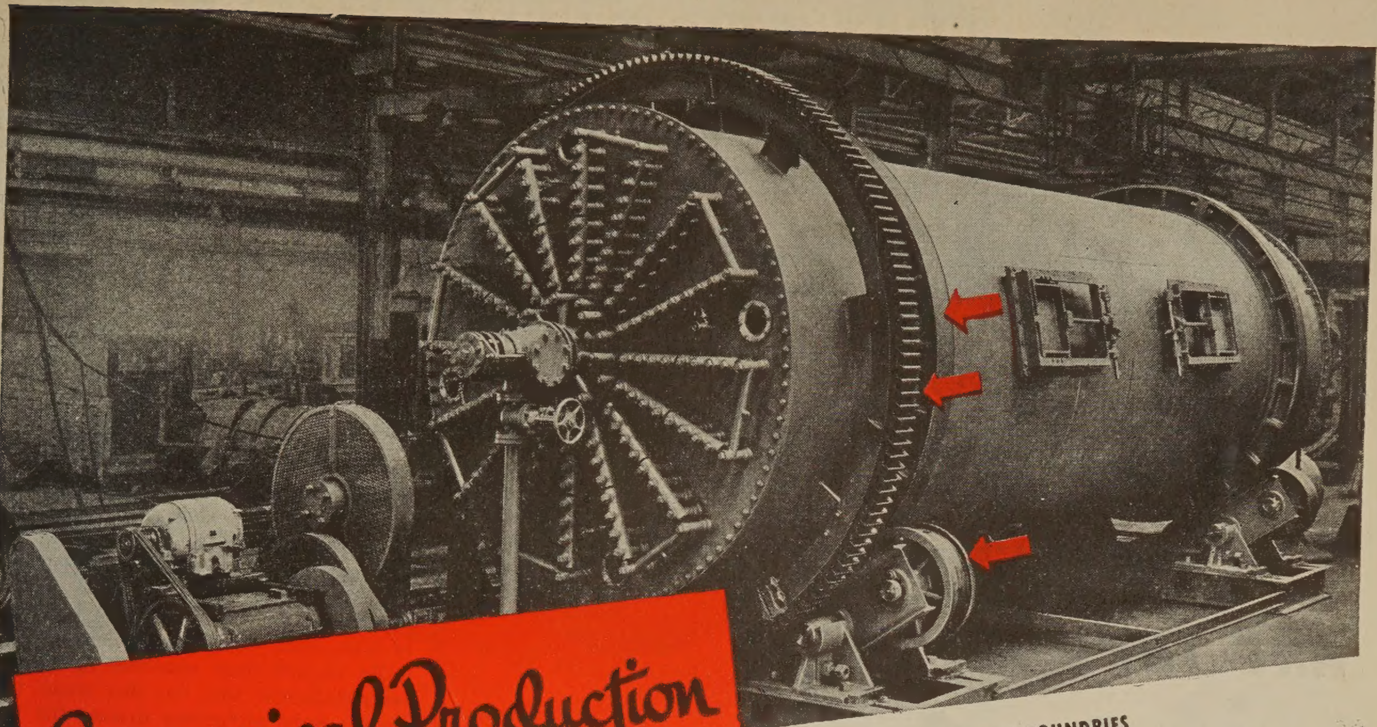
LIQUID CARBURIZING

Sir:

We have read with interest the article entitled, "Practical Aspects of Surface Hardening Methods" written by H. E. Boyer which appeared in the Aug. 14 issue. This article is a comparison of pack, gas, and liquid carburizing methods and because of our interest in liquid carburizing methods we would like to point out some features of the article which we believe are at variance with the facts as developed generally in industry.

We would like to call attention first to the chart in the lower right-hand corner of p. 75. This chart contains three curves plotting the rate of case penetration for the three methods of carburizing under consideration. Such charts normally are comparisons under the same operating conditions and unless the caption accompanying the chart indicates otherwise, the reader assumes that the operating conditions were comparable. The caption under the chart does not give the operating conditions but on reading the article it is found that the samples represented by the curves for gas and pack carburizing were carburized at a temperature of 1650°F, but the samples represented by the liquid carburizing curve were carburized at a temperature of only 1550°F.

It is stated that in many instances distortion is greater from a liquid carburizing bath than when similar parts are either pack or gas carburized. One of the distinct and outstanding advantages of liquid bath carburization is the substantial reduction in distortion accompanying the use of this method. There has been a large number of articles on the subject of liquid carburizing published over the past ten years in which this question of distortion is discussed thoroughly and almost universally the experience has shown that less distortion is produced in liquid carburizing than by any other method. The statement is also made that liquid carburizing is limited to operating temperatures of 1550° to 1600° F, or 1650°F at the maximum. The reason given is that at higher temperatures the sodium cyanide decomposition is too rapid. For at least five years liquid carburizing baths have been in operation in industry at temperatures of 1700° to 1800°F. The sodium cyanide decomposition rate in these baths is actually lower than that in the bath described in the article. Of course, the composition of the baths operated at these higher temperatures is not the same as that with which the author is familiar. A number of large fully mechanized liquid carburizing units have been installed in recent



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The sugar crystallizer presents a combination of improved service life as a result of the advantages of the better engineering characteristics in Meehanite castings with an improvement in the efficiency of the fabrication method.

The tires, rollers and drive gear are Meehanite castings. The tires, made in halves, are machined to provide a tight fit to the crystallizer shell and are simply bolted together. The Meehanite drive gear is bolted to supporting lugs.

Formerly large steel tires were welded around the entire shell, whereas the bolted Meehanite tires may now be easily replaced and running as they do against the Meehanite rollers provide a combination resulting in maximum wear resistance.

For further information along these lines write for our booklet "The Role of Castings in Engineering Production."

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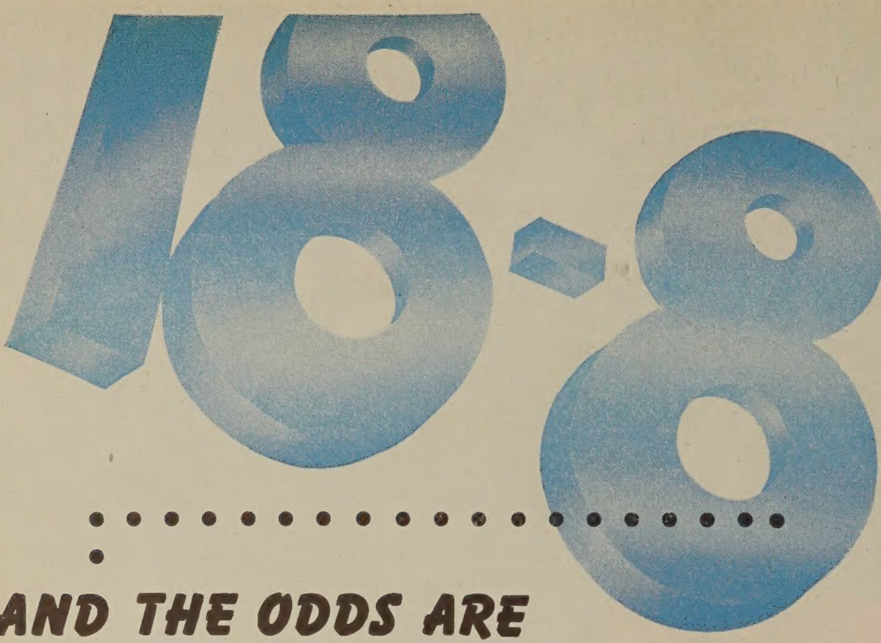

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The Nominal Analysis and Nominal Physical Properties of one of these, Circle Ⓛ 22, are given at left. However there are many variants of this approximate analysis which make possible its successful application to a wide range of service conditions. They are summarized on the new Circle Ⓛ Alloy Data Sheet, sent upon request.

LEBANON CIRCLE Ⓛ 22

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Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	9.00

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	75,000
Yield Point	36,000
Elongation in 2"—%	50
Brinell Hardness	135

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"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

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years. The operating experience developed in these large units shows that the cyanide decomposition is not excessive and that distortion is actually less than that experienced with pack and gas carburizing units which were replaced. Without exception, these large units are operating at temperatures of 1700° to 1750°F.

GEORGE D. JOHNSTON
American Cyanamid Co.
New York

● Editor's Note: *The following letter is a reply by Howard E. Boyer, Chief Metallurgist, American Bosch Corp., Springfield, Mass.*

Sir:

I believe that Mr. Johnston has lost sight of the fact that the article was meant as a guide to the manufacturer and was in no way intended as a discussion of feats that could be accomplished without regard to economy. It is true that comparative charts usually should show constant operating temperatures, but in this case the curves were purposely drawn for the most universally used carburizing temperatures which are 1650° F for pack and gas methods and 1550° F for the liquid method. We all know that carburization rates are about the same for the various methods if conditions are identical but to maintain such conditions usually becomes impractical in everyday practice.

As to the question regarding distortion, it has been the writer's experience as well as the experience of many others that the rapid heating of parts loaded with unbalanced stresses induced by machining will tend to deform more when subjected to an extremely rapid rate of heating. The liquid carburizer does apply the heat to the work far more rapidly than other methods. Maybe the work should not possess unbalanced stresses, but that is a condition we must live with in practice.

As stated in the article, however, another cause for increased distortion is the quenching temperature. Certainly we who have had many years in practice will agree that to minimize distortion a quenching temperature as low as possible should be used. So there again, the carburizing does not cause the condition, but it is usually most practical to quench directly from the carburizing temperature in the use of the liquid process, while in the gas or pack method intricate parts are usually quenched from lower temperatures. In one instance during the war, we were liquid carburizing gears at 1575° F. It was necessary to maintain extremely close limits which we could not quite do by using the high temperature quench. For reasons of appearance we preferred to use the liquid process, so that we resorted to quenching from 1575° F to a cyanide bath at 1425° F and equalizing the temperature before quenching in oil. Result—we achieved our aim. This is

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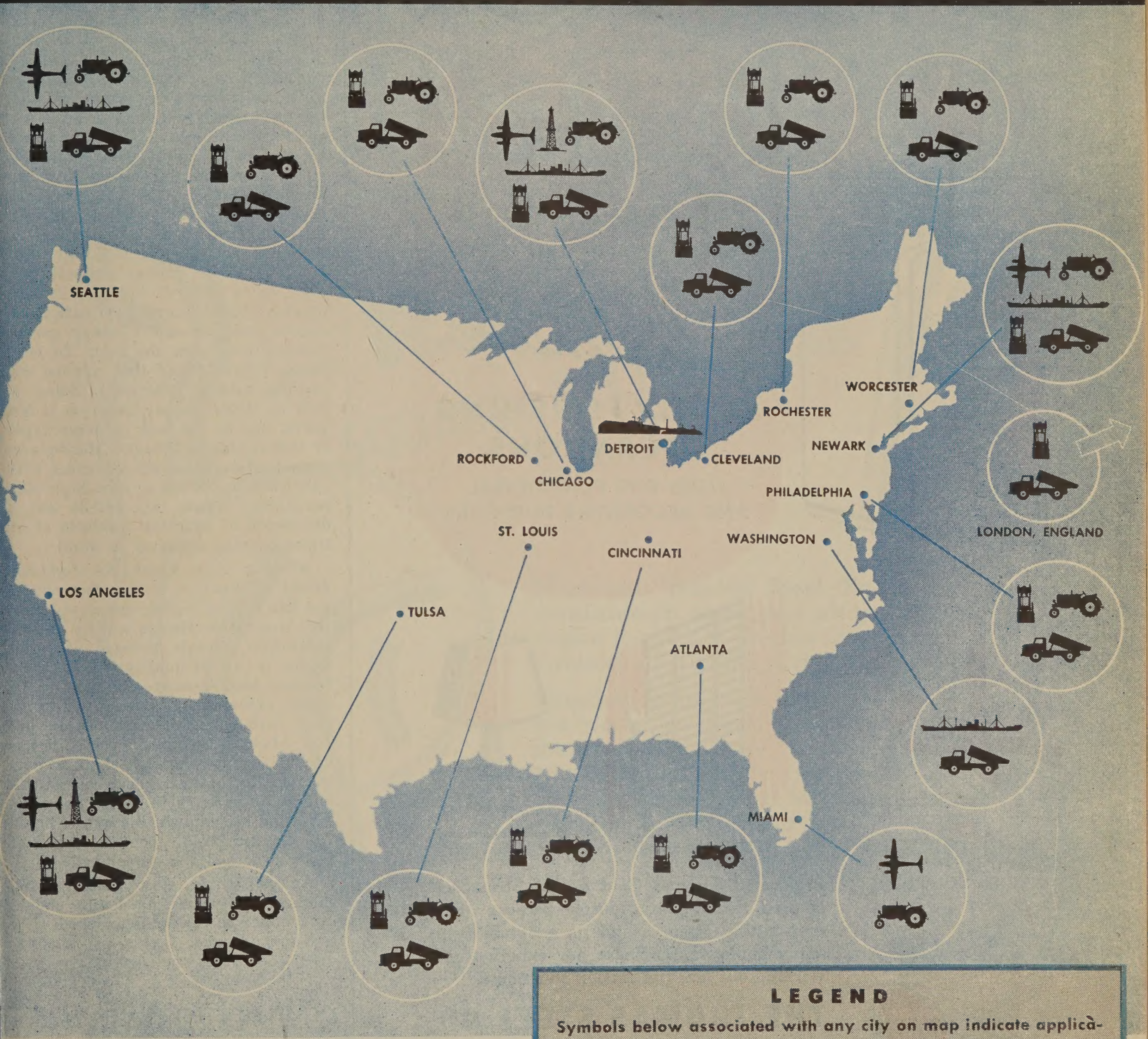
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merely an example of what can be done, but when it comes to using these variations in practice it frequently becomes impractical. Maybe a heat treater only has one liquid carburizer.

Perhaps it should have been more clearly stated that the practical liquid carburizing range is confined to 1550° to 1600° F, but since this article was designed for the practical individual, it did not seem necessary to add any discussion concerning what could be done if money was no object. I am not familiar with any liquid carburizing bath which will show a lower rate of decomposition at 1750° F, and shall be glad to turn over the facilities of my heat-treating laboratory to obtain a demonstration of this type of bath. I believe that about 75 pct of the users in this part of the country employ the temperature range of 1550° to 1600° F. A few use higher temperatures even up to 1750° F, but at this temperature the decomposition rate is excessive even though a heavy carbon cover is kept over the bath. In most cases, I have found that anyone employing such a practice is doing so just to obtain deeper cases on a few parts, due to the lack of other types of carburizing equipment. Most places cannot afford to supply a furnace with salt when operating at such high temperatures. Again this article was a discussion of practical methods at all times bearing economy in mind.

Another point which Mr. Johnston failed to mention is the decrease in pot life for the higher temperatures—this is a factor always worthy of consideration in this process. Another factor is that of quality when the extremely deep cases are obtained by the liquid process. It is readily granted that carburizing is carburizing, but how about a diffusion cycle? In gas carburizing we wouldn't think of carburizing to obtain the deep cases without a diffusion cycle. How does Mr. Johnston accomplish this by the liquid process and still keep in the realm of being practical and economical?

Again I would like to state that all methods of surface hardening should be confined to the fields to which they are best adapted.

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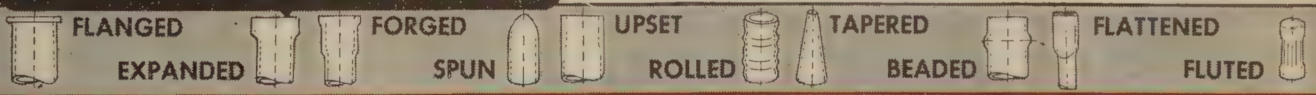

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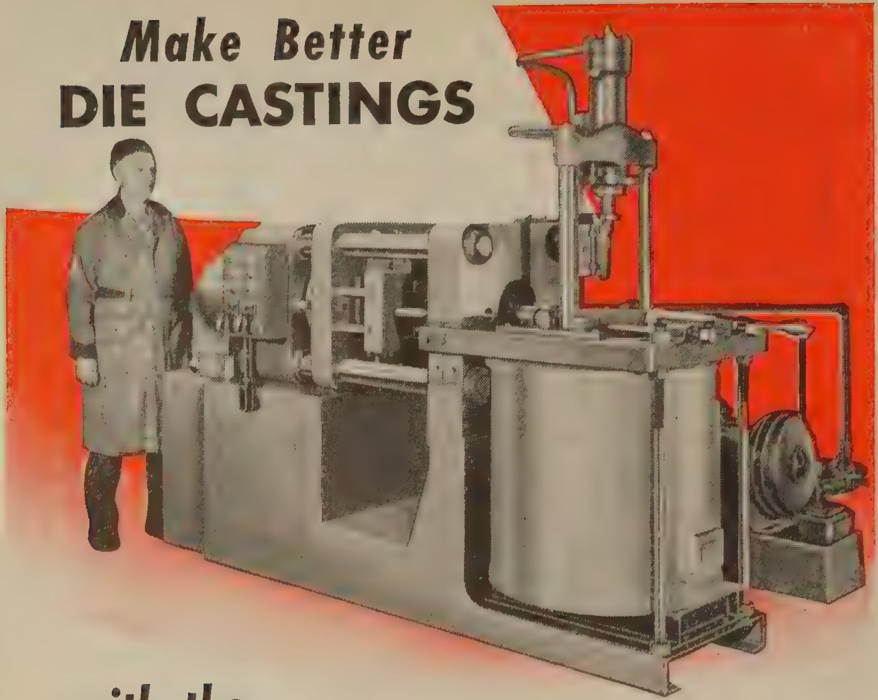

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In your issues of Aug. 21 and 28 you featured the article "Foundry Atmosphere." Could you supply us with reprints of this article? If so, we would require three copies.

C. F. PASCOE
Assistant General Manager
Foundry Div.
Canadian Car & Foundry Co., Ltd.
Montreal

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D. I. WHITING
FREEPORT, ILL.

BUFFING WHEELS

Sir:

I wonder if you have any statistics as to the sale in the U. S. of cotton buffing wheels and power buffing bonnets. I understand that there is some association of the manufacturers of these products. I am hoping to line up a manufacturer of these items and all information that you can send me would be appreciated.

HENRY C. PRAGOFF
68 Devonshire St.
Boston

● The association you have in mind is probably the Buff and Polishing Wheel Manufacturers Assn., 110 E. 42nd St., New York 17.—Ed.

LABOR PRODUCTIVITY

Sir:

Please send me the issue of your magazine containing your Labor Productivity survey.

ROBERT S. HARTMAN
Council of Profit Sharing
Industries
Wooster, Ohio.

● The survey appeared in the Jan. 2, 1947, issue.—Ed.

The
IRON AGE

Vol. 160, No. 15 October 9, 1947

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Editorial

The Wheat and the Chaff 59

* * *

Technical Articles

Solidification of Steel Ingots [Part I] 62
Water Tank Seams Welded 67
Report on Use of Tin-Free Solder 67
Good Plant Lighting 68
New Books 73
Tungsten Carbide Rolls for Wire Flattening 74
German Wartime Technical Developments 77
Modern Paint Removers 78
New Surface Hardener Combines Precision and Speed 84
New Equipment 85

* * *

Features

Fatigue Cracks 46
Dear Editor 48
Newsfront 61
Assembly Line 90
Washington 94
West Coast 98
Personals and Obituaries 102
European Letter 108
Industrial News Summary 110
News of Industry 113
Gallup Polls 121

* * *

News and Markets

Line Pipes to Take Six Million Tons of Steel 113
50 Years Ago 127
Industrial Briefs 128
New Construction 129
July Canadian Steel Output 130
Steel Shipments Up in 1947 131
A. J. Fisher Elected AISE President 133
C. R. Cox Attacks Depreciation Methods 134
Steel-Coal Wage Pact Denounced 136
British Try Gas Turbine Driven Boat 140
Machine Tool Developments 142
Nonferrous Market News and Prices 144-5
Iron and Steel Scrap News and Prices 147-8
Comparison of Prices by Week and Year 149
Finished and Semifinished Steel Prices 150
Alloy Steel Prices 151
Warehouse Steel and Pig Iron Prices 153
Ferroalloy Prices 154

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Index to Advertisers 203-4

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The Wheat and the Chaff

THE dangerous slipperiness of words was borne upon Mr. Taft in a rather painful manner during his recent dry run through the West. During this fretful eleventh-hour period of public clamor and reaction against high prices, it has been properly praiseworthy and politically safe to urge consumers to resist advancing prices—a voluntary rationing based primarily on an inadequate pocketbook and secondarily on moral indignation. But the slightly different terminology of, "Let people eat less, and less extravagantly!" brought down on Mr. Taft's head a veritable storm of criticism.

This all-too-human gap between advice and performance is an issue certain to preoccupy the attention of everyone for many months to come.

Western Europe must and will be fed this winter irrespective of real or fictional impact on the domestic economy. By the turn of the year it will become all too self-evident that Europe must be preserved from starvation, economic disintegration and political insanity. And, certainly, the genuine moral humanitarianism of the American people would permit no other course of action. The problem therefore becomes one of extracting essential grains from the American economy without precipitating speculative price advances of such proportions as to force a new and catastrophic inflationary twist to the domestic economy.

Neither the time, nor the emotional and political framework exist on which to re-impose forced rationing. A terrible, perhaps an impossible burden, therefore rests on the shoulders of Charles Luckman and his 26-member Citizens' Food Committee in their efforts to wiggle off the horns of the dilemma by voluntary action. A more clever or more energetic man could not have been selected for the task. And a small but exciting chance exists that the very seriousness of the situation may kindle the country's self-discipline to such a point as to discredit the cynics who point to past failures. That there is a past record of failure of voluntary action can hardly be denied. For meat consumption during the voluntary meatless-day plan of 1918 was higher than it was in either 1917 or 1919. And per capita meat consumption went up during World War II despite rationing, emotional stimuli and meatless days in restaurants.

The Luckman Committee lacks nothing in energy and sincerity and high resolve as to the magnitude and importance of crystallizing the fine-sounding phrases of advertisements and propaganda into energetic public support. But more important will be the realistic direct pressure already being brought to bear on the nation's brewers and millers. And, quite rightly, both the President and the Committee are focusing the full force of public disapproval on feverish activity on the Commodity Exchange, where the minimum cash margins for speculative grain futures is still less than half that required on the Stock Exchange.

To further the common effort, labor leader, politician and businessman have an obligation to temper the verbal flaying of their familiar whipping boys for high prices. Labor lays far too much emphasis on business profits, sterile nostalgia for OPA, and searching for price collusion. Businessmen would be wise to abandon their two-faced attitude on the nation's monetary policy, which is the major source of inflationary pressure. As for politicians, those coming from abroad should exercise restraint in their doubts of European want just because they didn't see people with bloated stomachs lying in the gutters. And some brave Congressman could possibly gather courage to inquire into the paradox of further raising of farm incomes by continued subsidy and price support at a time when prices are hitting new peaks. It would be unfortunate to have a repetition of the 1946 destruction of potatoes, and just recently the government was forced to purchase 160 million dozen eggs while expressing wonder as to what was to be done with them.

By spring the country will know whether or not it has reaped a whirlwind at home or abroad. If so, a frightened people may well be inclined to sort the torrent of words for the wheat and the chaff in their melancholy search for who sowed the wind.

T. W. Lippert

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The IRON AGE

NEWSFRONT

Oct. 6, 1947

► Foundries in the Albany, N. Y., district are so pressed for pig iron supplies that they are now paying $60 per ton delivered for Colorado pig iron.

► Automatic self-sealing inner tubes have caught on with the motoring public. During the first half of this year B. F. Goodrich reports the sale of more than twice as many of its self-sealing tubes as in any 12 months period prior to the war.

► More than a third of the total national production of washing machine tubs are now being made of aluminum. Much of this represents recent conversions from various steel products to the light metal, at an average cost of about $3 above the cost for enameled steel tubs. This usually means an increase of about $15 in the list price of the machine itself.

► The other two of the "Big Three" automotive producers learned during the war what Ford has realized for years--there is big money--and strong business friendships--to be made in a strong vertical distribution system of replacement parts through regular dealers of new cars.

Ford agencies always have bought most of their parts direct, and have sold the greatest majority of the Ford parts that are used. Similar tactics by other producers are reducing the field for independent parts jobbers and warehouses. Most replacement parts now cost about 30 pct above the prewar level.

► Just 20 years ago most new cars and trucks were delivered by railroad. Today the railroads have less than half the business; the rest goes in trailers or is driven over the roads to dealers.

Dealers for the most part prefer to get passenger cars off trailers, as the usual rail shipment has about 3 days' work for the dealer to do in reassembly, while the cars driven off the trailers can be ready in a few hours.

► Alloy steel business is not up to capacity, but salesmen in the alloy departments have no statistics with which to measure their performance. Many companies do not regard high strength low alloy steels and electrical sheets as "alloys" but shipment figures without these items are not published.

► Current accent on jet plane progress is on bombers rather than on fighters. And since most bombers are multijet jobs, this has stepped up the pace of jet engine production and development work at all stages--special steel production for jet blades being carried along with the tide.

► The British Southern Railway has ordered three 100-mph diesel-electric locomotives as a part of an already announced plan to convert an additional large section of the Southern's system to diesel or electric power.

► The price of steel--based on THE IRON AGE finished steel composite price--is today 14 pct less than it was during World War I. The number of man hours required to make a ton of steel is 33 pct less and the labor cost per ton of finished steel is 191 pct higher.

► Estimates in Detroit indicate that about 50,000 tons of steel is being bought by the auto industry monthly for conversion deals. Most of this is electric steel ingot, but the auto companies are now having trouble finding adequate rerolling capacity for available ingots. In countries where the government takes a more active part in business custom would be for carbon steel production in electric furnaces to be granted a direct subsidy. In the United States, however, it is the "conversion" business that is paying the premium for this high cost production.

► A New York interest is handling the disposal of 175,000 tons of new ship plate bought from the government. The plate widths run up to 70 in. It is hoped by those who have this material that it can be sold to hand sheet mills to be used as sheet bars.

The price of the plates is to be the mill price, but there is nothing in the arrangement that prohibits part of the payment to be in finished sheets. Most hand mills have been approached as a possible buyer of the ship plates.

► Rumors persist in Detroit that through redesign, substitutes of weldments for forgings and castings and the use of light materials the new Fords may weigh 300 to 400 lb less than the present models. Up to the present time, Ford appears to be the only producer moving in the direction of lighter cars.

► Sweden's export business in iron ore has doubled this year, coming sharply out of last year's slump. Total iron and steel imports into Sweden are at their highest figure since 1939.

► Present estimates are that railway traffic in Europe will be almost normal next year--excepting Italy and Greece. Disruption of coal supplies could mar this optimistic prediction.

► A man caught on a subway platform with a slide rule in his hands tells us cars are tough to get because the war ate up enough steel to make 230 million of them. Carrying his world almanac under his arm, he tells us that would be one for you and me, and everyone else in North and South America.

. . . Solidification of

Of vital importance to the steelmaking industry is a consideration of the factors affecting solidification of steel ingots. Attacking the subject mathematically, in order to lead to a better understanding of the functioning of ingot molds, the author develops his analyses around K, a comparative measure of the linear freezing speed. In this first part of a four-part article, fundamental concepts regarding solidification are introduced, and methods whereby K values can be utilized, are presented.

METHODS of calculating the length of time required for complete freezing of steel ingots of almost any shape and of various carbon contents in the ordinary range of steels will be discussed in this study of the solidification of steel ingots. This discussion, which is essentially a correlation of several previously published papers (see bibliography), will reveal several relationships which apparently have not been noted heretofore as being among the factors affecting solidification. The laws of freezing described will explain how the design of some present-day molds could be improved, either to better localize piping, to change the location of some nonmetallics, or to insure a better distribution of stresses in the mold or in the ingot. As results so far published in this field are few and disconnected, one purpose of this article is to invite scrutiny of the methods presented herein.

In the basic and well-known formula $D = K\sqrt{T}$, D is the distance frozen from the mold wall in inches, T the corresponding time in minutes, and K is supposed to be a constant factor. If, in this formula, T is made $= 1$, $\sqrt{T} = 1$ and $D = K$, consequently $K =$ distance frozen in 1 min. The very value of K, therefore, is a comparative measure of the linear freezing speed. An ingot with $K = 1.6$, freezes twice as fast as an ingot with $K = 0.8$, providing K refers to a same ingot type. This can be shown in another way. The formula $D = K\sqrt{T}$ can be written $D = K \cdot T^{1/2}$. Since D is the distance frozen varying with T, the speed of freezing, is $\frac{dD}{dT} = \frac{1}{2} KT^{-1/2} = \frac{K}{2\sqrt{T}}$. This means that at any chosen time defined by T, the speed of freezing is proportional to the K value, as already noted.

The whole mechanism can be analyzed more easily through fig.1 (A, B), which gives, respectively, the distance frozen and the speed of freezing as a function of the elapsed time since first contact between steel and mold, for $K = 0.8$ and $K = 1.6$. In any case, the speed of freezing is very great at the beginning (theoretically, ∞), but falls off rapidly with time. As a result, for any given K value, short distances to freeze are greatly at advantage as regards time required. For instance, for $K = 0.8$, as in fig. 1A, $D = 1.6$ in. as compared with $D = 3.2$ in., i. e., half the distance, requires only one fourth the time. This advantage in favor of short distances holds true for actual solidification curves as observed on ingots—for which K may deviate more or less from a constant—and this is the basic reason

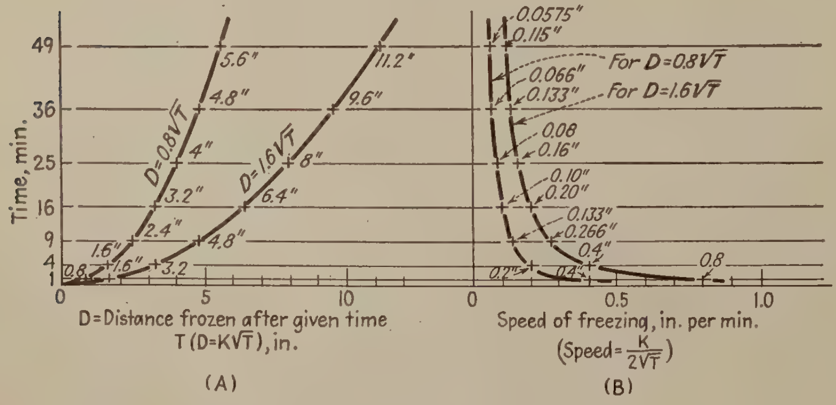


FIG. 1—Curves indicating distance frozen (A), and speed of freezing (B), as a function of elapsed time since first contact between steel and mold.

Steel Ingots . . .

By J. R. FLECHE
Republic Steel Corp.,
Cleveland

why flat ingots freeze in a shorter time than square and round ingots having the same section area, as will appear later.

K in the same ingot varies with the direction along which it is measured and is directly proportional to the length of the radial vector in that direction. The following examples are all for 1 pct Carbon steel[1]: Round ingots—$K = 1.21$ and 1.09; square ingots—$K = 1.09$ and 1.02; flat ingots—$K = 0.94$ and 0.92.

From the previous comments, these experimental K values could be interpreted as proving that the round ingot freezes faster than the square ingot, which freezes faster than the flat ingot. Yet, it will be shown that for a same section area, same relative mold wall and same steel, the order of freezing speed is just the reverse; that is, the flat ingot freezes faster than the square ingot, which in turn solidifies more speedily than the round ingot.

One reason for this apparent paradox will be found in the following analysis. Referring to fig. 2A, W and t are the wide and narrow sides of a flat ingot for which the K value has been measured, respectively parallel to the wide and narrow sides K_W and K_N, as shown. The distances to freeze are respectively $\frac{W}{2}$ and $\frac{t}{2}$; but the time for complete freezing must be the same regardless of the direction considered; then

$$\frac{W}{2} = K_W\sqrt{T} \text{ and } \frac{t}{2} = K_N\sqrt{T}, \text{ or } \sqrt{T} = \frac{W}{2K_W} = \frac{t}{2K_N} \text{ or } \frac{K_N}{t/2} = \frac{K_W}{W/2}.$$

In other words, in the same ingot K varies with the direction of measurement and is proportional to the length of the radial vector in that direction. This law has several important consequences:

(1) Referring to the flat and oval ingots of figs. 2B and 2C, if the (K) value along any direction is known the K value along any other direction can be obtained by simple proportionality to the new radial vector involved:

$$\frac{K_{OA}}{\overline{OA}} = \frac{K_{OB}}{\overline{OB}} = \frac{K_{OC}}{\overline{OC}}$$

(2) Since K varies all around the section, a more representative value could be expressed as an average and measured on the average cooling vector; that is, the average geometrical secant of the ingot section. Failure to do this is the reason why the usual K value has the appearance of being smallest for the flat ingot, intermediate for the square and the largest for the round. This is simply because it is measured on the shortest possible vector (respectively half the narrow side, half the side and half the diameter). Computing the K factor on the average cooling vector would reverse the order of the values, as already stated and as will appear more plainly later.

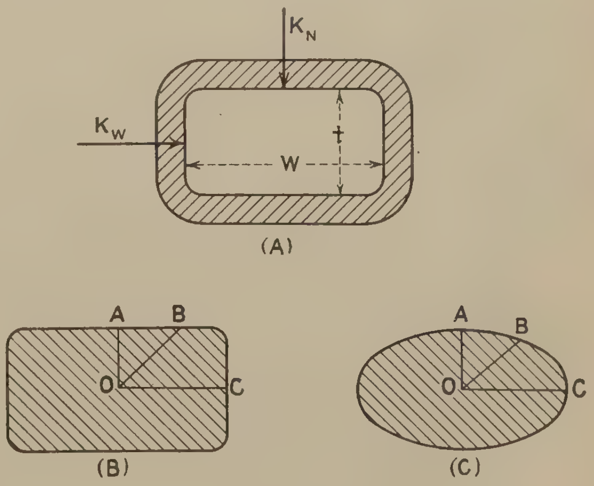
(3) A flat ingot with sharp corners can be considered as the intersection of two slabs. From this it will be shown that the freezing power of one of the slabs, defined by a particular K value, can be added to the particular K value of the other slab, to give the total K value of the flat ingot. But this addition can only be made when both K values are expressed on the same vector and this implies transposing the K value of one of the slabs onto the one vector used for the other, according to the above law. In other words and referring to fig. 2B, assumed to have sharp corners, one may know the partial K values of the constitutive slabs (partial K values here designated as $K/2$), that is, respectively, $\frac{K_{OA}}{2}$ expressed on $(\overline{OA})$ and $\frac{K_{OC}}{2}$ expressed on $(\overline{OC})$. But if one considers freezing along $(\overline{OA})$, the total K value of the flat ingot will be

$$\frac{K_{OA}}{2} + \frac{K_{OC}}{2} \times \frac{OA}{OC}$$

and along (OC) $= \frac{K_{OA}}{2} \times \frac{OC}{OA} + \frac{K_{OC}}{2}$.

This results directly from the phenomenon as above analyzed. When solidification proceeds at a certain speed along $(\overline{OC})$, it is really proceeding along another direction (OA) or (OB). For in-

FIG. 2—Sketches indicating distances to freeze of various shapes of ingots.



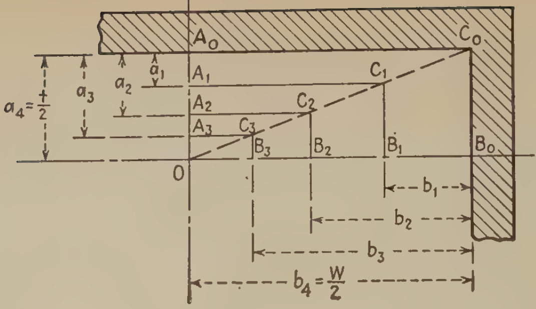


FIG. 3—Sketch indicating profiles along which boundary line of freezing moves inward during solidification.

stance, at another speed which is directly proportional to the new vector involved:

$$\frac{\frac{K_{OC}}{2}}{OC} = \frac{\frac{K_{OC}}{2}\times\frac{OA}{OC}}{OA} = \frac{\frac{K_{OC}}{2}\times\frac{OB}{OC}}{OB}.$$

Adding the particular K values of the constitutive slabs without such a transposition would have no meaning, because each is originally expressed on a different vector.

Meaning of the proportionality of the K values to the coresponding cooling vectors was just explained. If this proportionality law was holding all along the solidification process, it would mean that the boundary line of freezing would move in, as shown in fig. 3, along successive profiles $A_1C_1B_1$, $A_2C_2B_2$, etc, points $C_1C_2C_3$ etc, being all located on the diagonal (OC_0).

This is supported by the case of the square ingots of Nelson[1] which show progressive solidification practically concentric to the mold, with a square core of liquid steel turning to a round shape only in the last stages. Corner effects are very slight and this is completely at variance with the pronounced corner effects revealed by the isothermals in the quenching of square and flat sections of solid steel, for instance[5]. The difference is apparently due for a part to the presence of an inner core of liquid steel at constant temperature in the case of the ingot, which liquid core transmits more or less perfectly all around the cooling effect of any and all elements of the mold wall; and for another part of the time element which is much larger in the case of the ingot and can only favor equilibrium in the above action, as solidification proceeds more and more slowly and extends on more and more time.

One thus arrives at the notion that, basically, solidification proceeds all around as a percentage of the vector to the center of the ingot for each point of the ingot surface.

Compared to this, the two flat ingots of Nelson solidified as shown in figs. 4 and 5. Freezing, instead of following the diagonal (C_0O), proceeds along the lines ($C_0C_1C_2C_3$, etc) which apparently rejoin the diagonal at the very center. Otherwise, in the first stages and for both ingots, solidification parallel to the narrow sides, represented by vector (FN), not only was far larger than the value given by the diagonal, but even exceeded the value given by the 45° line (C_0E), meaning a uniform thickness of frozen steel all around.

The fluctuations in K values in the two directions can better be seen in fig. 11, E and F, and especially fig. 16, all referring to the same ingots. On the basis of later findings, the progressive cooling curves in the two directions in fig. 11E and F could be reproduced by computation, providing K in the narrow direction is taken much larger in the early stages. The influence is that the discrepancies shown by these ingots are due to the fact that heavier walls take more time to heat and thus keep longer their early cooling power which is higher. But as the several systems of walls become heated, there is less and less difference in the cooling power in the several directions, with the result that the diagonal law is more and more observed. In other words, there is apparently a differential in cooling power due to uneven heating of two walls differing greatly in thickness and slowly disappearing, with the liquid core always acting as a regulator for the distribution of frozen steel around the center of the ingot.

At any rate, the very nature of the phenomena involved indicates that the several systems of faces of such composite molds never cease to add

FIG. 4—Procedure of solidification along a short 14x20-in. ingot.

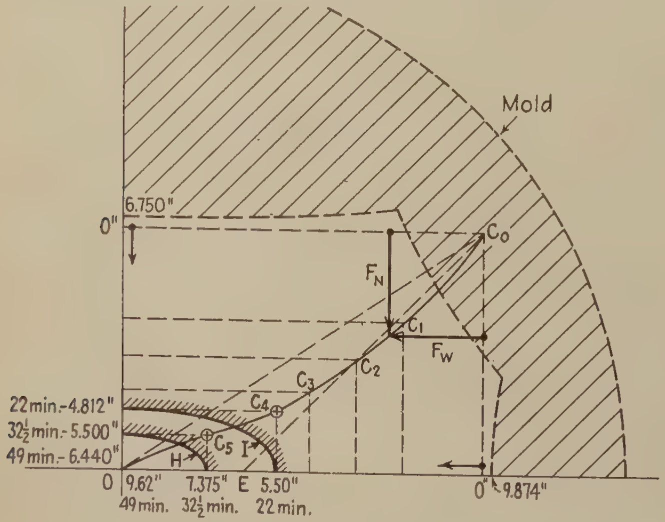
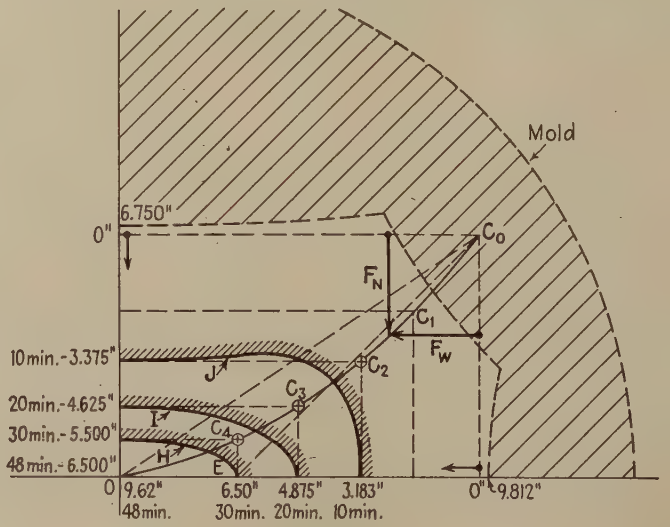
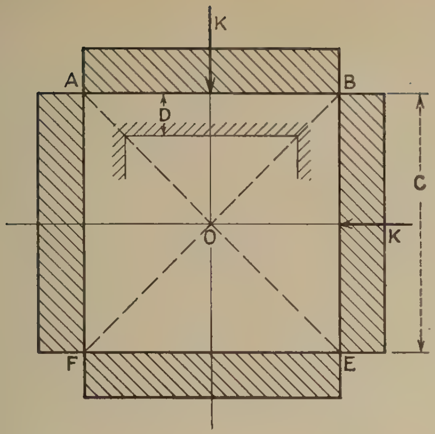


FIG. 5—Procedure of solidification along a long 14x20-in. ingot.





LEFT

FIG. 6—Solidification of a square ingot.

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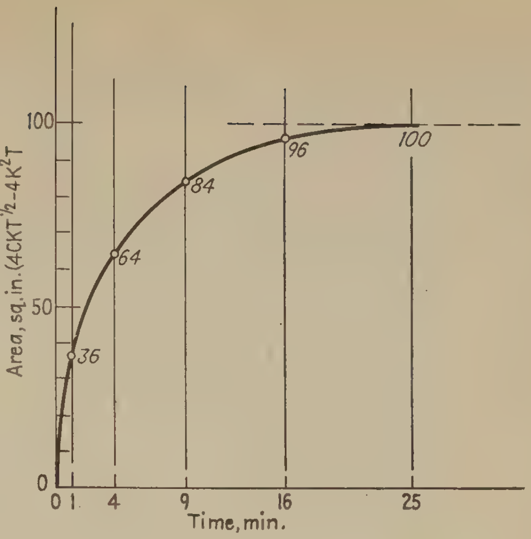
RIGHT

FIG. 7—Progression of frozen area with time in a square ingot with (K) a constant throughout solidification (and equal to 1).



their cooling power to each other and the total effect should be verified in the end. In time, it will be effectively verified that the K values of the above flat ingots can be reproduced very closely by summing up the K values commanded by each part of the mold walls. As will be seen shortly, the computation really implies a summation of freezing powers as governed by the various wall elements—which, from above, should rather be made for the end of solidification only.

The question now is to know how partial K values, as above considered, can be determined. As a step towards that end, first examine what is the relation between the K values of the square and flat ingots and the K values of the constitutive slabs.

First observe that the K value of a square cannot be a constant throughout solidification, although it may approach a constant towards the end. Assume (K_{square}) to be a constant throughout solidification and estimate the area progressively frozen in a square of side (C). With the help of fig. 6, the depth frozen at a time T is $D = K\sqrt{T}$ and the area frozen =

$$C^2 - (C - 2D)^2 = C^2 - (C - 2K\sqrt{T})^2, \quad \text{or}$$

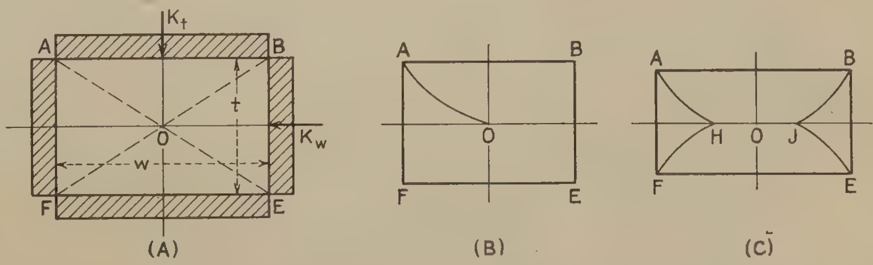
$$\text{AREA} = 4CKT^{½} - 4K^2T \quad (1)$$

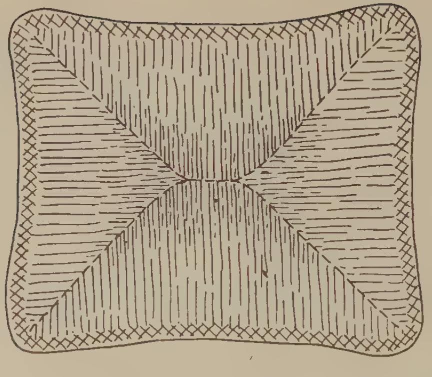
Taking an example with $C = 10$ in., $K = 1$, leads to a progressive area, as plotted in fig. 7, which reaches a limit at the end of solidification. This can be verified by the derivative of the above equation relative to $T = \frac{2cK}{T^{½}} - 4K^2$ which effectively takes a zero value at the end of solidification, when $C/2 = K\sqrt{T}$, or $\sqrt{T} = C/2K$.

This picture is obviously in error, because, at the end of solidification, any ingot continues to cool and would freeze additional metal if more was to be frozen. The only conclusion is that (K_{square}) cannot be a constant and must be increasing progressively, at least towards the end of solidification. Figs. 11, A, B, C and D, referring to the square and round ingots of Nelson, effectively illustrate (K_{square}) and (K_{round}) values increasing progressively from beginning to end of solidification. Fig. 16 shows that this increase is of the order of 1.0 at the start, to 1.04 to 1.07 at the end, for the particular examples. Fig. 16 also tends to prove that K approaches a constant towards the end of the square and round ingots of the same examples. From the rest of this study, there are indications that (K_{square}) and (K_{round}) may show a much larger increase and even a decrease from beginning to end, although always terminating on an increase, depending on the size of the mold wall compared to the size of the ingot (i. e., the relative wall).

Relation between (K_{square}) *and* (K_{slab}).—In a square ingot such as shown in fig. 6, made up of two slab molds with walls sharply limited at the corners, it may be observed that, at the end of solidification, the square mold freezes the full section area, while each set of slabs freezes two triangles, such as (AOB) and (EOF), representing half the total area. From the standpoint of freezing power, one can therefore write: $(K_{\text{slab}}) = ½ (K_{\text{square}})$. Thus, (K_{slab}) as here used is simply a fictive value resorted to in order to estimate the freezing power of every set of flat walls in a composite mold. It is not meant to depict the rate of freezing in each constitutive slab, which is obviously the same as in the square. It should rather be regarded as a measure of the efficiency

FIG. 8—(A) refers to a flat ingot whose mold is made up of two slab molds, with no solid corners; (B) indicates solidification for an ingot whose (K) values on the two sets of faces are not in proportion with the respective sizes of the ingot; (C) indicates the solidification of an ingot whose (K) values on the two sets of faces are greatly unbalanced.





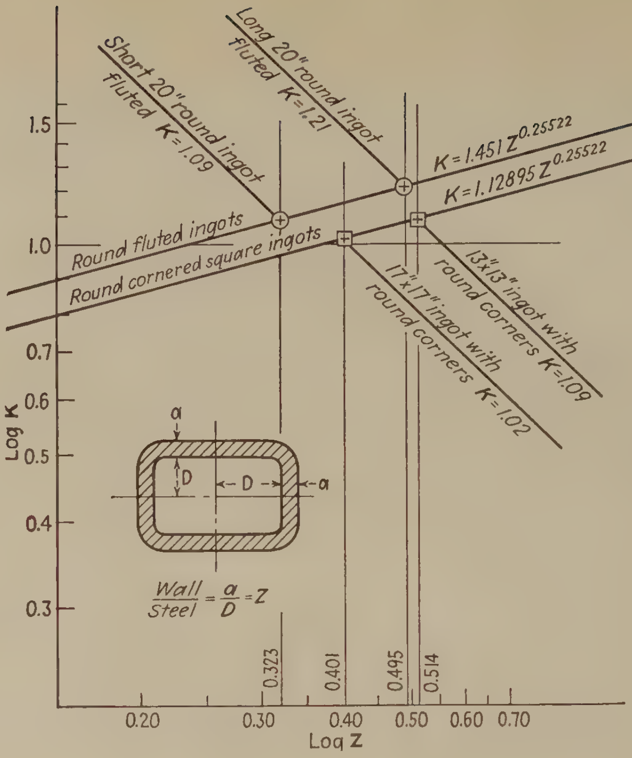
ABOVE

FIG. 9—Structure of a 17x20-in. 18-8 stainless steel ingot.[7]

o o o

RIGHT

FIG. 10—Relation between original (K) values (Nelson) and relative wall (Z).



of the slab compared to the square. It is properly a freezing power.

Rectangular ingots—Fig. 8A refers to a flat ingot whose mold is also made up of two slab molds, with no solid corners. It is further assumed that the K values of the squares of sizes t and W, K_t and K_W, are proportional to the corresponding vectors to freeze $\frac{t}{2}$ and $\frac{W}{2}$ At the end of solidification, the areas frozen are:

$$\frac{K_t\cdot\sqrt{T}\cdot 2W}{2} + \frac{K_W\cdot\sqrt{T}\cdot 2t}{2} = Wt, \qquad (2)$$

leading to $\sqrt{T} = \dfrac{\frac{t}{2}}{\frac{K_t}{2} + \frac{K_W}{2}\times\frac{t}{W}}$

$\frac{K_t}{2}$ and $\frac{K_W}{2}$ are the respective (K_{slab}) values, as above understood. The freezing time could have been derived by transposing $\frac{K_W}{2}$ onto the wide faces, for a total K value on these faces $= \frac{K_t}{2} + \frac{K_W}{2}\times\frac{t}{W}$, and considering $t/2$ as the distance to freeze, which gives:

$$\frac{t}{2} = \left(\frac{K_t}{2} + \frac{K_W}{2}\times\frac{t}{W}\right)\sqrt{T}, \text{ or}$$

$$\sqrt{T} = \frac{\frac{t}{2}}{\frac{K_t}{2} + \frac{K_W}{2}\times\frac{t}{W}} \qquad (3)$$

These two expressions are identical and prove the transposition method to be correct, so long as (K_{slab}) is used as above defined.

In case the K values on the two sets of faces are not in proportion with the respective sizes of the ingot, the third equation will still be good for the end of solidification, so long as it proceeds to the center of the ingot at the end, as shown in fig. 8B and as observed for the flat ingots of Nelson, figs. 4 and 5.

In case the K values on the two sets of faces would be greatly unbalanced and lead to solidification along (AH) in fig. 8C, the time could be much shorter than here calculated and the ingots would have a plane of weakness, or piping located in an extended flat pocket (HJ) as shown in fig. 9. This would also mean that the rate of solidification was so much predominating in one direction that there was insufficient time to produce a proportional effect in the two directions on the liquid core before solidification was completed. Hence the rates of freezing would be bound to show a great decrease in one direction and a great increase in the other direction, just as observed for the two flat ingots on Nelson, fig. 16.

Yet, there is the example of the 18 x 38-in. Armco ingot (referred to later) with walls much less out of balance for which the rate of freezing in the narrow direction is such as also plotted in fig. 16, which differs slightly from those of the square and round ingots and implies a case where the present method of calculation can be applied.

Numerical values for the K factors as above considered.—Following experimentation, Nelson[1] determined K values as already listed for square, round and flat ingots, all of 1 pct C steel and of the hot top type.

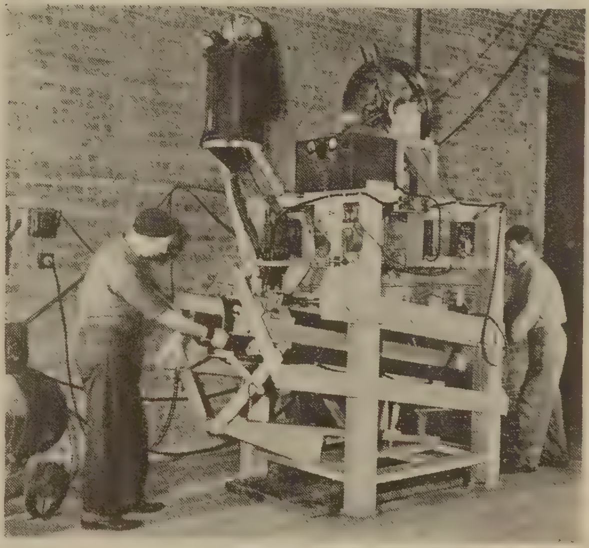
Since K, in each case, is a comparative speed of freezing, one should expect higher K values in case of heavier walls. The log-log chart of fig. 10 shows that there is apparently, for each type of ingot, an exponential relation between the K value and the relative mold thickness, that is, the ratio of the wall to the corresponding vector to freeze, here taken right under the hot top $\left(\text{the ratio } \frac{a}{D} = Z\right)$ as illustrated in fig.10. This location seems best for the case because the lower parts of the mold are already coated with a layer of frozen steel when solidification starts at the top and consequently must act with a reduced freezing power. It is realized that the relative mold wall at mid-height in the ingot would better be considered, since it would automatically take care of differences in the volumes of the ingots associated with different and sometimes reversed tapers. But the problem would be more complicated while the conclusions would not be substantially different.

In a subsequent issue the author will continue his mathematical study of ingot solidification and will discuss various corrections to K values to permit comparisons with other types of steels and other types of ingots.—Ed.

Water Tank Seams Welded In Continuous Mill

PRODUCTION of 14-gage water softener tanks has been stepped up to 180 units per hour through use of a welding mill developed by the engineering department of Bell & Gossett Co., Morton Grove, Ill. The mill, which welds the longitudinal seam on 9-in. diam tanks at 120 ipm with 500 amp dc, utilizes the Linde Unionmelt process and was designed when production of the tanks with hand welding methods failed to meet increased schedules.

The mill, shown in the accompanying illustration, is designed with three full-length guides which can be adjusted by a centrally located worm for tanks of different diameter. Four equispaces roller guides confine expansion in the welding zone. The tank shells are die-formed for accuracy and are manually fed into the rear of the mill. They continue through the mill on a series of powered, serrated rollers which pass the shell over a mandrel and under the Unionmelt welding head. The unwelded seam is split by the knife-blade mandrel support, which in turn acts as a guide to align the seam properly. A spring loaded, water cooled, copper backing shoe incorporated in the mandrel directly under the welding zone keeps the weld puddle from falling through and is said to permit 100 pct penetration of the weld.



Report on Use of Tin-Free Solder

TIN-FREE solder can be used as a replacement for tin-containing solder to a limited degree according to a report on wartime solder research available from the Office of Technical Services, Department of Commerce, Washington 25. Four other reports cover experiments and tests to find tin substitutes for use in tin-lead solders.

The results of investigation of industrial uses of tin-free and low-tin solders made by the Battelle Memorial Institute at Columbus are presented in two reports, one of which is a brief survey of the use of solder in the electrical industry. A fourth report gives details of an investigation made to replace tin in solder with silver and the fifth gives results of experiments made in studying the properties of modified lead-silver solder as a substitute for tin-lead solders used in the manufacture of small arms ammunition boxes.

Titles of these reports are as follows: (1) PB-25417, Strategic Metals—Elimination of Tin from Solder; microfilm $1.00; photostat $1.00; 2 p: (2) PB-22737, Investigation of Industrial Uses of Tin-Free and Low-Tin Solder, Part 3 (final report); microfilm $1.00; photostat $4.00; 56 p: (3) PB-63566, Investigation of Industrial Uses of Tin-Free and Low-Tin Solder, Part 2, Use of Solder in the Electrical Industry (final report); microfilm $1.00; photostat $2.00; 18 p: (4) PB-69119, Silver Replacement for Tin in Solder; microfilm $1.00; photostat $2.00; 18 p: (5) PB-20509, Solders, Investigation of Substances for 70Sn/30Pb Solder used on Terne Plate Ammunition Box Liners; microfilm 50¢; photostat $2.00; 20 p.

CONTINUOUS rows of two-lamp fluorescent units, spaced on 8-ft centers, provide more than 50 ft-c in this shop. Two 40-w lamps are used in each reflector.

Good

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and
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THE soundness of the lighting recommendations for an industrial operation depends upon how well they correspond to the seeing tasks involved. In every installation the questions arise, "What must be seen?" and "How is it seen?"

These questions, at the core of every lighting problem, relate to every factor of plant efficiency and safety. Complete or satisfactory answers, translated into lighting systems contribute more to good plant operation than the expenditures for lighting equipment, current and maintenance indicate. To understand what a good system of illumination can contribute to industry, lighting principles must be appreciated and utilized.

Lighting seldom accounts for as much as 4 pct of operating costs and usually much less. The differential in cost between an adequate installation and a poor lighting system is of a still lower order. Poor lighting, because of the train of bad effects which stem from it, is almost always more expensive than well planned, well maintained lighting.

Within any factory there is a wide variety of seeing tasks. Many varied operations may take place within a single room. General lighting requirements cannot be fully appraised by knowledge of the eye and seeing alone. The psychological value of a bright, cheerful work place defies measurement, yet the working environment, attitude and resultant alertness may contribute as much to quick, accurate production and safety as does the act of seeing itself.

Light and paint are the two most potent forces in banishing gloom and glare, turning dark, gloomy rooms into a pleasant place to spend the working day. This promotes cleanliness, good housekeeping and pride on the part of employees. Good lighting is a powerful employee and community relations tool. This is a function of good general overall lighting which is independent of the type of factory or actual work performed.

For general lighting of manufacturing areas today, practice ranges from 20 to 100 ft-c. A 50 ft-c level is common practice for new fluorescent installations, with attention to specific areas or rooms where lower levels suffice, or where the higher levels are required.

Today, with sources of radically higher efficiency and a range of equipment from which almost any operation can be offered a lighting system expressly suited to its needs, attention turns to principles. A good system is not simply the result of "paying enough." Illuminating en-

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Coupled with good lighting is the necessity of coordinating a worker's visual skill with the visual demands of a job. This phase of the industrial "seeing" problem was covered in the article, "Visual Skills V. Employee Efficiency," THE IRON AGE, *July 10, 1947, p. 60—Ed.*

Plant Lighting Is Profitable Lighting

Industrial lighting has an important influence on every factor of plant efficiency and safety. An appreciation of the potentials of effective lighting requires an understanding of certain basic principles. This article discusses these principles and explains why poor lighting is actually expensive lighting. The authors cite a number of case histories, including several foundry installations, and also describe a low cost maintenance illuminating system for high bay areas.

gineers do not make recommendations today solely in terms of the quantity of light. They stress the practice which best answers the questions "What must be seen?" and "How is it seen?" They call attention to the means most likely to produce desirable visibility for specific jobs, as well as adequate, safe levels of general lighting. Visibility, it can be pointed out, is not the number of footcandles, which simply measure the quantity of light incident on a unit area of the work. It is the light returned from the work to the eyes, and therefore its reflectance, together with its brightness in relation to that of surrounding surfaces, and such matters as glare and direction or diffusion that ultimately determine the relative difficulty of the visual task. So the engineers add a third question to the first two, "How easily is the work seen?"

Several years ago a research project of the Illuminating Engineering Society investigated a number of seeing tasks representative of the variety of jobs in a single industrial plant. After considerable study the research group took for the fundamental problem the seeing task involved in the discrimination of detail upon plane or curved metallic surfaces, exemplified in such a frequently repeated operation as the reading of a micrometer caliper. The seeing task is a matter of distinguishing fine cut divisions on the metal scales which are part of the caliper. This problem constituted a representative example of "What must be seen?"

The research found that workmen read the scales by distinguishing the finely cut divisions as dark lines against a light background. Thus the smooth, semipolished reflecting surface be-

° ° °

FIG. 1—The effects of various lighting arrangements are illustrated in this study of the readability of markings on a micrometer. View marked A shows the effect of inferior lighting from a filament source in a reflector. View B shows an improvement over A. The illumination reflected from the scale appears as a narrow band, which makes the divisions difficult to see. The divisions can be easily read in view C where the lighting was a large diffuse source of low brightness.

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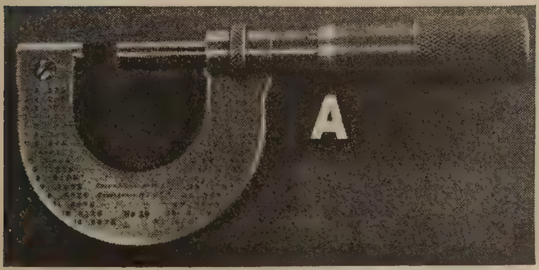

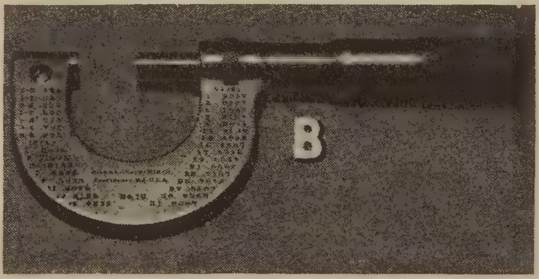

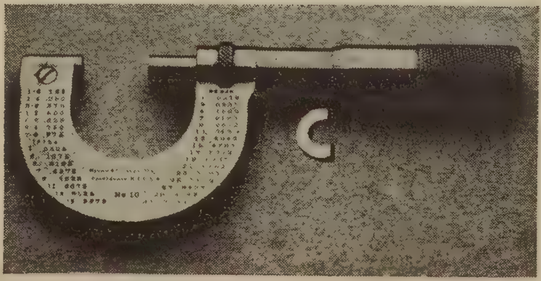

tween the cut marks made the latter visible by contrast. Here was the "How is it seen?"

It was found that workmen did this task with the least effort with the aid of diffuse illumination. The best visibility was obtained when the light came from a large, low-brightness area so that a uniformly bright background was formed on the semipolished surfaces between the cut marks, as illustrated in fig. 1.

When the same amount of light from smaller "point" sources was tried, the seeing task became more difficult, even glaring, because the semipolished surfaces were not smoothly illuminated. Thus the question: "How easily is the work seen?" arises as a regular criterion of the usefulness of a lighting system. In this connection it is helpful to note the fluorescent lamp, now widely used in industry for general lighting systems, has provided a versatile tool of relative large area and low brightness. These characteristics combined with its high efficiency have led to its wide acceptance in manufacturing operations demanding easy seeing of the task.

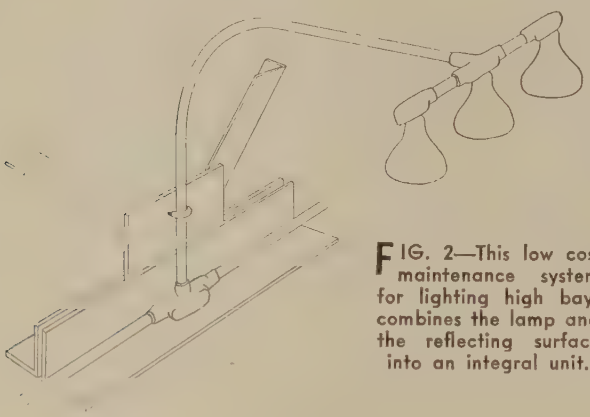

FIG. 2—This low cost maintenance system for lighting high bays combines the lamp and the reflecting surface into an integral unit.

A problem common to many plants is how to increase plant capacity with two- or three-shift operations and keep the necessary number of skilled men on the later shifts. The older, skilled men usually have enough seniority to choose their shift. They are not easily induced to change unless inducements overcome their objections. When they can earn as much or more on a later shift without feeling more fatigued, they may be persuaded to change.

Good environmental conditions that will convince them that their abilities will have as good or a better chance on the night shifts are often decisive factors. In plants where a special effort has been made towards this end the second and third shifts have produced as effectively as the day shift. Better lighting is an absolute necessity in creating the environment in which the seeing faculty can perform at its best over a period of hours without excessive strain or fatigue.

Workmen's eyes can be fatigued with poor seeing conditions, putting a definite obstacle in the way of production. An increased accident rate is usually a consequence of such conditions. If lighting is considered as a safety factor, it can also be recognized that the contribution it makes to reduced accident frequency are the same that provide a stimulus to production. It is the elimination of glare, either directly from lighting units, or that which is reflected from the work, and the provision of levels of maintained adequacy that help to transform lighting into the plus factor it should be. When the lighting is right for the work, that visual fatigue which is so often reported as employee carelessness will be minimized, and along with it the accident record. Most human impressions are through the eyes and among a group of employees the eyesight capacity of the various individuals varies widely. Management compounds trouble, expense and delay for itself when it hires average or subaverage eyes and puts them to work under subnormal lighting conditions.

Some of the most successful plants in the metal industries are proceeding today on the premise that it is best to check the job and the worker first. Such plants have also found that economy in industrial insurance and acceleration in production call for dependable seeing conditions in all areas at all times. Even minor accidents are too expensive to tolerate for the lack of good lighting.

Heavy industries, particularly foundries, recognize that complacency about dirt and smoke, as inevitables of the work, stands in the way of applying lighting wisely. No industry today can be complacent about conditions that go hand in hand with a high accident frequency, greater accident severity and a rapid turnover of employees.

All industry today is concerned with procuring and retaining labor, even more so than in the war years. The plants with the best working conditions, often in the light industries, are having the advantage in 1947 in this respect. But foundries, like other industries, are faced with the problems of increased costs and the demand for greater production. As a consequence, the old attitude about dirt and sweat is changing.

Foundries are making increased use of mechanized handling, special machinery, automatic inspection, quality control, and lighting. Lighting is particularly emphasized because it relates to every other factor designed to meet the objectives of these policies. Some of the larger plants with more capital can go all out to achieve most of these changes promptly. Others may have to make their changes step by step with a more watchful eye on income and expense. For either, lighting offers the most immediate benefits. When well designed and properly maintained, it is an industrial tool of prime significance.

A new system of filament lighting for high bay areas is discussed later in this article. For the plant that is seeking an immediate benefit in modernization at a minimum outlay, this new system offers a number of advantages. Chiefly because maintenance costs are almost negligible and light output high, even in dirty factories, the system is unusually attractive to many plants.

While a lighting system which operates without much loss of efficiency and with practically no maintenance expense is a natural for some industrial areas, it is not a panacea. A lighting specialist noting the trends towards mechanization and better plant housekeeping in traditionally dirty industries would emphasize the benefits of a planned lighting program. With this he

General Lighting Classifications—Current Practice

General Manufacturing Areas of All Kinds

50 Ft-c (Range 40 to 60)—Recommended for most areas. Exemplified by the prevalence in widely diverse manufacturing areas of modern systems of continuous rows of two-lamp, fluorescent fixtures properly spaced from 9 to 12 ft apart, depending on installation layout considerations. In high bay areas combined filament and mercury systems, properly spaced, are commonly used to provide levels of this order.

80 Ft-c (Range 60 to 100)—Recommended for high speed or highly skilled work where levels of this order may sometimes obviate the need for a multiplicity of supplementary localized lights. Also particularly applicable in crowded areas. Typical of the best installations of this nature is the grid pattern of fixtures, that is, continuous rows at right angles. This arrangement has the additional merit of controlling shadows and reflected brightness where these factors are important in quick, accurate seeing.

30 Ft-c (Range 20 to 40)—In present day practice, this level represents the minimum objective in new or relighting projects with individually spaced fluorescent, filament, or mercury lamp units. Principally applicable for less precise operations, where bulky materials are handled, or where processes require only casual seeing; or where the area per employee is large or where specialized machines, individual processes or operations definitely require supplementary lighting of considerably higher value or of specialized quality or distribution at the point of work.

Nonproductive and Service Areas

Packing, shipping, active warehousing	20 ft-c
Steam and chemical processing	20 ft-c
Boiler and pump rooms, compressors, etc.	10 ft-c
Elevators, toilets, washrooms, lockers	10 ft-c
Storage areas, inactive; corridors	5 ft-c

Localized or Supplementary Lighting

Precision grading, inspection, assembling, fine bench and machine work, sewing, fine finishing . . . 100 to 500 ft-c. Illumination of this order is easily obtainable by the use of small localized industrial spotlights or small fluorescent units mounted close to the work; or with continuous rows of fluorescent units mounted a foot or two above inspection or assembly benches, or above belt conveyer lines.

would urge a planned lighting maintenance program. The success of the latter gives relevance to the need for the former.

In outlining a planned lighting program a specialist would first classify your plant space with respect to the physical layout and the use made of it. What type of seeing task required for every plant area would further refine his classification. In order that his recommendations would ultimately correspond to the seeing tasks, the specialist would give consideration to the degree of detail to be seen for every department. All factors involved in delivering the quantity and quality of light which will enable a worker to do his job efficiently, with a minimum of fatigue, would be checked before deciding on details of the system.

"What must be seen?" "How is it seen?" "How easily is the work seen?" If the specialist has prescribed the system which is equipped to take care of the basic lighting functions, the next step belongs to the plant management. It must determine how effective the wisdom of the planned lighting program will be in aiding production schedules and keeping workers satisfied with their working conditions.

For the considerable areas in heavy industry where mounting heights of more than 25 ft are called for, the lighting specialist might recommend the new filament system referred to previously, or a system using mercury lamps. He might recommend a combination system of filament and mercury lamps. Whatever the choice for a specific case the main objectives in such areas are generally achieved if the safety requirements are well supplied with lighting for traffic and circulation.

Installation of 3000-w mercury lamps in these areas has provided satisfactory illumination with reduced maintenance costs. These units when employed at, say, 40-ft mountings and installed on 35 to 40-ft spacings, can provide about 35 ft-c in service. Equipped with disconnecting hangers at a small increase in installation cost, these units can be kept at high efficiency with easy, low cost maintenance.

Some recently reported examples of the benefits of good lighting in the foundry follow. Wilson Foundry & Machine Co., Pontiac, Mich., cast and machine the engine blocks for the Willys jeep. As a step towards increasing production of quality castings, the foundry began a relighting program. The first fluorescent installations were made in the company's machine shops. Results were so good that the lighting program was extended through the big plant.

Excellent results continued as the new lighting was extended to the core room. Here the core foreman reported core quality up 25 pct with a corresponding increase in production. Workmen said the improved lighting not only made the jobs easier to perform, but by cutting down re-

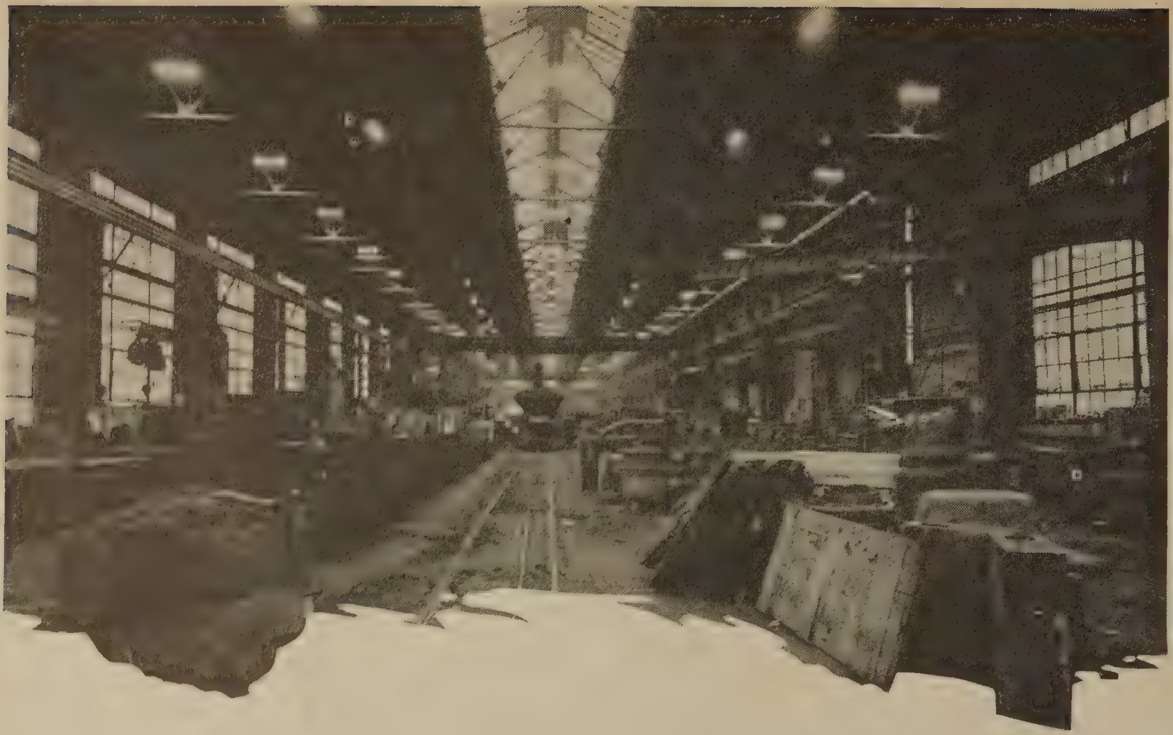

FIG. 3—An example of the lighting unit shown in fig. 2 applied to a foundry.

jects helped them increase their pay on the piece work system. With the use of Electrostrip wiring material suspended from cable any unit of the system can be removed for cleaning in about 2 min. A maintenance program geared to the vital importance of the lighting keeps three men busy cleaning and relamping fixtures. A fixture laundry includes a test board for checking fixtures and equipment.

A small castings foundry at the Deere & Mansur Works, Moline, Ill., has modernized operations by regulating cleanliness and freshness of the air and by complete functional designing and the mechanization of former hand operations. The plant is located in a new building. There are two stories in the molding section and four stories in the cupola and sand conditioning section. This design affords the basic advantages of hoisting materials only once. Gravity and electrically powered conveyer systems take over most of the heavy manual labor. Hand pouring and shoveling are practically eliminated. An outstanding feature is the electrically operated ventilating system which automatically supplies workers with clean, fresh air. The lighting problem is also simplified and equipment operates at consistently higher levels.

Molding is done on the second floor; the skilled molders being further shielded from dust, fumes and smoke by a "drop curtain" separating molding stations from the pouring floor. The seeing tasks are thereby reduced conserving energy for the main job throughout the day.

Modernization of methods generally paves the way for introducing the benefits of better lighting. Foundry cleaning room practice has not been developed largely because it had not seemed worth trying. Foundrymen who have wondered if it would pay to light their cleaning rooms can turn to the experience of the Lake Foundry, Muskegon, Mich., who have found that it does pay. Tangible results are more castings passing first inspection and fewer accidents. Extension lights are less frequently required and inspections are easier and more accurate. With levels as high as 70 ft-c the darkest job in the foundry has been changed to the brightest. More tons of castings can be cleaned in an 8-hr shift now. The mold making and mold assembly lines have been relighted too. Here the results were even more satisfying since a considerable increase in production with many less spoiled molds has been achieved.

"What must be seen?" "How is it seen?" Is it by brightness or color contrast, contrast of detail on background by silhouette or reflected image? However the work is seen, consideration should be taken of character of the surroundings, factors in the field of view. Is an amount of shadow desirable? Is the direction of the light right for the task? These and many other questions must be checked carefully to prescribe the kind of lighting system that can accelerate production schedules and conserve the worker's energy.

The motives that impel people to work are so complex it is difficult to evaluate, among the obvious reasons, to what degree some can be overlooked and others must be carefully respected. The phrase working conditions, used so much today, embraces a large group of motives. What combination of factors that add up to working conditions will evoke the best worker response will differ from situation to situation. Lighting is always an ingredient of this complex set of inducements. The data compiled by Elton Mayo's industrial researches disclosed that workers who felt themselves part of a special project in which the individuals of the group shared a responsibility for the project's success could do wonders of performance.

Industry is probably a long distance from the time when the general work performance of employees can be organized to utilize energy and enthusiasm so effectively. In the meantime we can undertake to apply as much of the good conditions we are persuaded to regard as immediately practical. Better lighting, like clean washrooms and good dispensary service, is an easy must. Good lighting is an efficient production tool.

Lighting is part of the metabolism of any kind of industrial operation. To the extent that it is neglected or too scantily provided, costs are added to other items of expense. Because lighting is at best so small a percentage of operating cost, because its effect is exerted many times its proportion to its expense, its wise use is a fundamental economy.

Low Cost Maintenance System for High Bays

Practical considerations very often dictate the final recommendation for lighting in a foundry, or in heavy industry areas where there is much smoke and dirt. It is difficult to escape the fact that as long as present foundry practices are continued, such as the use of sand for molds, and oil or other volatile materials as binder, some of the sand and the binder are going to find their way into the atmosphere. Much of this material can be removed from the building, but there will always be some particles within the plant itself which eventually find their resting place.

One approach to this problem has been a lighting system utilizing the reflector lamp. This lamp combines the source and the reflecting surface into a complete integral piece of equipment, as shown in fig. 2. These lamps have a shape somewhat different than the ordinary pear-shaped lamps in that they have sloping sides which are internally mirrored to provide the reflecting surface. The end through which light is emitted is relatively flat.

When burned base up, as indicated in the accompanying photograph, dirt and dust will collect on the upper surface of the lamp, but this will have little effect on the light output. Experience has indicated that very little, if any, light-obstructing material collects on the bottom surface, so that no cleaning of the lamps is required.

Several installations of this type have brought out the following features. Maintenance consists solely of replacing lamps at burnout. Installing them in clusters of two or more provides flexibility. If one lamp goes out, the others will continue to provide light. Replacements may be made on a weekly or biweekly schedule, thereby reducing maintenance costs still further.

Additional flexibility is obtained by wiring and switching arrangements which allow one or more lamps at each outlet to be turned on separately. Thus, when molding and pouring are in process, all lamps can be turned on, whereas during periods of shake-out or general maintenance work, a lesser amount is available if desired.

In the particular installation shown in fig. 3, the units, clusters of three 300-w lamps, are mounted on approximately 15x16-ft centers to provide an average of 35 ft-c in service, varying slightly across the room. The only maintenance factor used in designing such installations is that which takes into account the light output depreciation of the lamp itself as it goes through its normal life span of 1000 hr.

Outlets have been staggered so that when any one of the four cranes in the area stops at a particular location, the most it shuts out is the light from the one cluster. There will always be light on the working floor from the adjacent clusters. Another feature in this particular shop was the mounting of lamps some 2 ft above truss line, thereby using the trusses to shield the bright lamps in long distance viewing. The lamps tend to disappear in the distant parts of the room.

. . . NEW BOOKS . . .

"Men and Volts At War," by John Anderson Miller. The story of how the General Electric Co. mobilized its facilities for war production is told. Typical of the subjects included are turbines for ship propulsion, development of the turbosupercharger, electricity in aircraft, power plants on the fighting fronts, development of radar, new equipment and materials, and atomic research and engineering. McGraw Hill Book Co., 330 W. 42nd St., New York 18. 272 p. $3.75.

* * *

"Atomic Energy Regulation," by Irving R. M. Panzer. Loose-leaf publication covering the legal and procedural aspects which stem from government regulation, domestic and foreign, of atomic energy. Background material such as senate committee hearings and reports is given as well as comment as to what, why and how certain laws are applied. Initial unit contains accumulated material in expansion binder with classification scheme and separation tabs. Pertinent material in classified and integrated form is supplied for six months. Matthew Bender & Co., Albany 1, N. Y. 450 p. $25.00.

* * *

"Heat-Treatment of Steel," by Edwin Gregory and Eric N. Simons. This book deals with temperature measurement and control, pyrometers and thermocouples of various types, gas, electric and oil-fired furnaces, refractories and equipment. The principles and processes of heat-treatment and their application to steel production are given. Pitman Publishing Corp., 2 W. 45th St., New York. 358 p. $4.00.

* * *

"Lighting Handbook," by Westinghouse Lamp Div. Handbook contains a variety of technical data designed to aid illuminating engineers, utility lighting specialists, architects, contractors, consulting engineers and others. A precalculated foot-candle table is included for predicting results obtained by various types of interior lighting installations with a minimum of mathematics. Westinghouse Lamp Div., Bloomfield, N. J. $2.00.

Tungsten Carbide Rolls For

Increases in roll life of up to 50 times that of steel, higher speeds, closer tolerances and improved finish are among the advantages resulting from the use of carbide rolls for wire flattening. This article gives the background of the development of these carbide rolls and describes the experience of Sylvania Electric Products Co., Inc., in rolling ribbons for the radio tube industry on machines equipped with carbide rolls.

ALTHOUGH the method of cold rolling wire to form ribbon is not new, the electronic industry has demanded high-speed production of various metal and alloy ribbons which could not be economically produced using equipment available in the war. With the improvement of radio tubes and the development of new electronic devices, requirements for stainless steel, various nickels and numerous plated ribbons have grown to vast proportions. While exercising all due caution regarding roll pressure and good surface wire, many of these materials grooved steel rolls within 5 or 6 days. The bright surface desirable on some ribbons also was lost within several days.

The life of any roll used in rolling fine ribbon will depend upon the influence of the following three factors: (1) Tolerance Requirements—The narrow dimension limits of ±0.0001 in. on production quantities of certain ribbons required by radio, jewelry and other industries necessitate frequent roll reconditioning, which is not only a costly operation but forces extensive downtime on the machine. Physical property limits and tolerances on straightness are also close and slight wear on the rolls may easily affect the shape, size and camber of the finished ribbon.

(2) Roll Pressures, Speed and Temperature—These items are governed by the material and are guided, to a great extent, by the experience of the machine operator. When starting a cold high-speed mill, the roll pressure must be changed with the increase in roll temperature. Various water cooling systems have been successfully employed to maintain constant roll temperature. Temperature control is very important when material requiring close dimensional limits is being rolled. A variation in roll temperature causes a variation in ribbon thickness which, if not carefully controlled, may easily go beyond specified limits of ±0.0001 in. or 0.0002 in. on fine ribbons. The life of any roll may be short if excessive pressures are used. Various materials require different roll pressures to form a definite width-thickness ratio.

(3) Type of Material—Roll life may be prolonged if copper and softer metals are rolled exclusively on a mill. Some of the plated wires also provide satisfactory roll life when the plating is soft and acts as a lubricant. Stainless steel, Z nickel and others may soon groove hardened steel rolls which will throw, subsequently, rolled softer alloys out of dimension. Day to day changes in the type of wire being flattened obviously create problems of economies, not only rapid wear on the rolls, but loss of ribbon material caused by rough rolls. Extremely hard materials or slightly oxidized wires may groove steel rolls within 30 min.

Development of Carbide Rolls

The original wire flattening operation at this plant was first accomplished using hardened steel rolls. Various finished sizes from 0.002 x 0.004 in. to .003 x 0.100 in. were rolled with a top speed of 500 fpm. However, nickel alloys, nickel plated steel and hard alloys resulted in poor roll life, along with low production of satisfactory ribbon. Steel rolls used for flattening nickel plated steel were capable of an average run of 7 to 10 days before regrinding (see fig. 1) was necessary.

The pressing need for longer wearing rolls directed attention to the potential possibilities of chromium plated steel rolls. Approximately 0.002 to 0.004 in. of chromium plate on the surface of steel rolls doubled the life of the rolls. With this improvement, roll life was still measured in days and frequent regrinding and replating was necessary. Extreme roll pressure flaked and chipped the plating to produce rough rolls which, in turn, resulted in defective ribbon.

Throughout the war years, Sylvania's engineers recognized the higher production and greater economies made possible by the use of cemented carbides of tungsten, titanium and tantalum. Carbide tipped tools were used for high-speed cutting and machining. Brazed carbide tips were

Wire Flattening . . .

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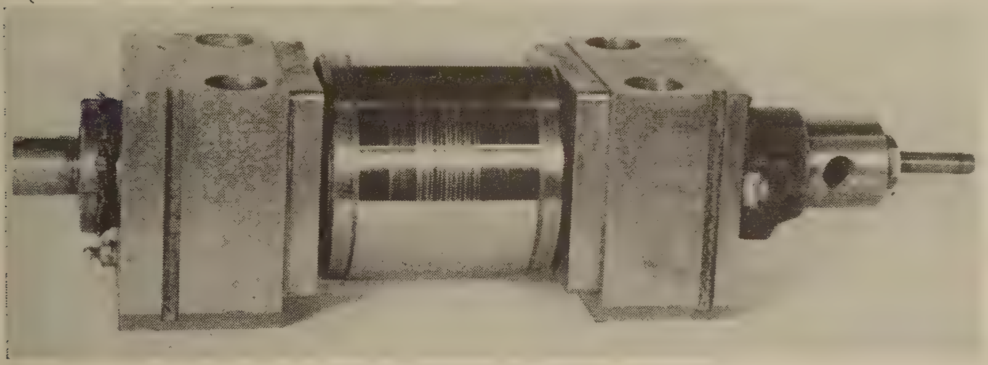
employed on circular saws for cutting highly abrasive bakelite and other plastic parts used in the electronic industry. Punching and forming dies were found to hold closer tolerances and increased die life, in some cases, 100 times that of steel. Wire drawing dies were used successfully except for the fine sizes. The experience obtained on these varied uses of cemented carbides led to further developments and pointed to carbide rolls as the possible answer to higher production, extended roll life and a better finish on rolled flat wire.

A producer of cemented carbides was approached with the problem. Although they had little or no experience at that time with carbide rolls, they were willing to attempt an experimental roll made in three sections. The first carbide roll was made for Sylvania's single pass mill. A heated bushing was first shrunk onto an arbor. Three carbide rings, approximately 3 in. I.D. by ½ x ¾ in. face, were forced on the bushing with a press fit. The carbide rings were separated by ⅛-in. dividers and a lock nut held the assembly in place.

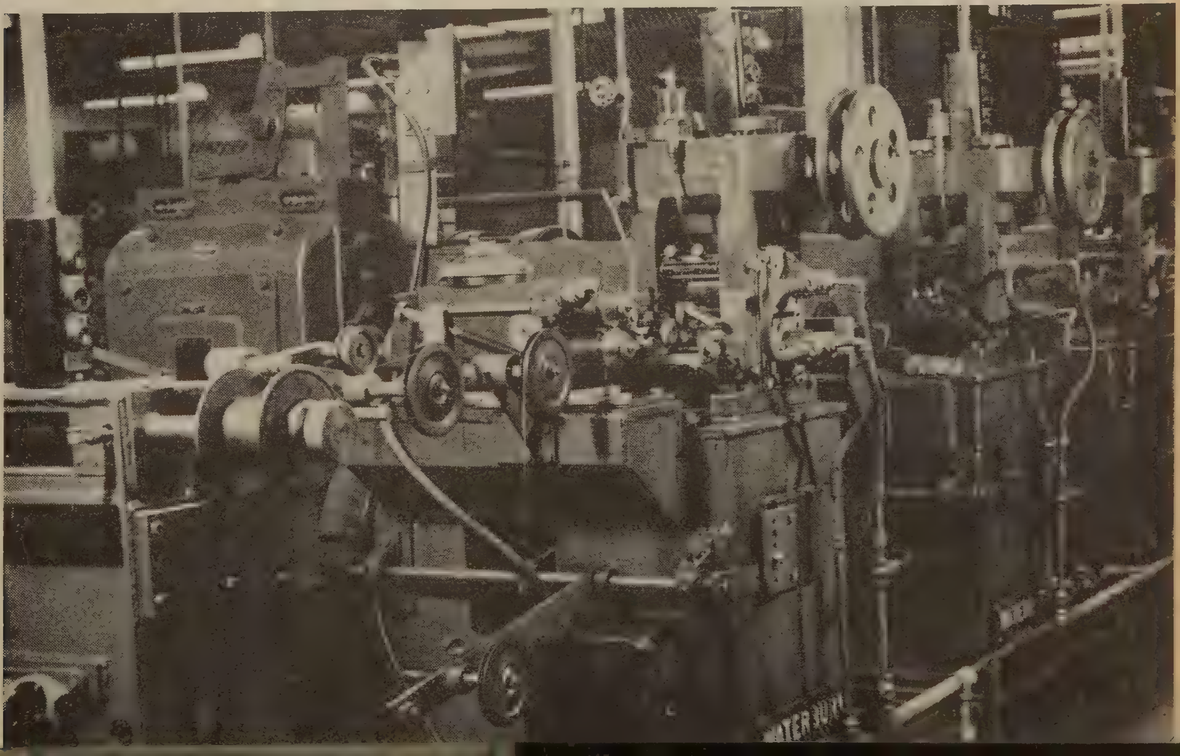
The ¾-in. faced rings increased roll life by 24 times that of steel and 12 to 14 times that of chromium plated rolls. Closer tolerances were possible on the ribbon with better surface and the downtime was cut considerably.

Sylvania soon purchased a triple tandem mill, shown in figs. 2 and 3, from Waterbury Farrel Foundry & Machine Co. The machine was furnished equipped with steel rolls. Experience with the first carbide rolls left no doubt as to



LEFT

FIG. 1 — Typical grooves produced on steel rolls used in flattening wire.



RIGHT

FIG. 2—Triple tandem wire flattening mill equipped with carbide rolls. This mill is equipped with water cooled rolls, constant tension device and flying micrometers.

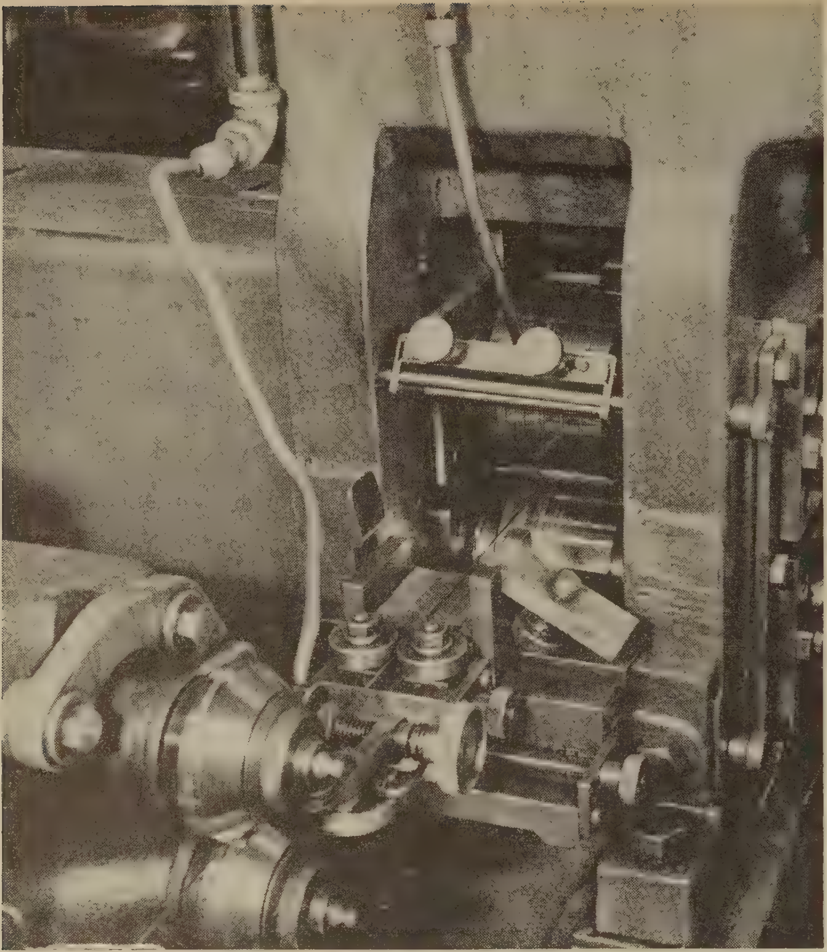


FIG. 3—View of the final pass on the tandem mill showing carbide rolls. The flying micrometers are visible in the left foreground. The grooves on the upper roll were ground in to produce half round ribbon.

the advantages, and new rolls were immediately designed for this machine.

Engineers of the Metal Carbide Corp. suggested a carbide sleeve with a 2½-in. face. An experimental order was placed for a set of rolls to be constructed using a one-piece carbide sleeve forced with a press fit onto a steel sleeve after the steel sleeve had been shrunk to the arbor. The carbide sleeve, held in place by the lock nut, contained no dividers. The cone material is SAE 4140.

The set of 2½-in. faced rolls was installed in the tandem mill on June 15, 1945. The rolls were repolished July 1, 1946, and have been in operation since that time. The increased roll life is partially credited to the fact that continuous movement of the ribbon along the 2½-in. face of the roll is possible. The roll life has been multiplied by 50 times over the steel and 25 to 40 times over the chromium plated steel.

The thickness uniformity required by close tolerance ribbon depends largely on the concentricity of the rolls. If the rolls are ground and polished while running on their own bearings in the mill, many variables are eliminated and a closer approach to perfect roll roundness is possible. Regrinding is accomplished by first roughing with a 220 grit diamond wheel and finished with a 500 wheel. The rolls are then polished with balsa wood and diamond dust in olive oil. Very little metal is removed unless the rolls are grooved.

There are several precautions which should be given consideration when using carbide rolls. It is possible to groove carbide rolls by flattening rough or oxidized wire with excessive roll pressure. One set of rolls, however, in use over 2 years has rolled many thousands of pounds of fine wire, which includes silver plated copper, nickel plated copper, nickel plated steel, phosphor bronze, Nilvar, stainless steel, beryllium copper, nickel "A", "D", "Z", tantalum, molybdenum, Monel, Nichrome, Copperweld, brass, liquor finished steel, high carbon steel and many others. These rolls have shown no marked evidence of wear to date.

The starting size of round wire, which determines the final ribbon size, will differ when the wire is flattened with steel rolls as compared with carbide rolls.

The average rate of thermal expansion of metal carbides is approximately one half that of steel in the range of 68° to 1300°F. It necessarily follows that carbide rolls constructed with a steel arbor are susceptible to cracking and the roll temperature must be carefully controlled. The mill shown in fig. 2 is equipped with both a heating and refrigerating unit and the functioning of both is integrated with the control of the mill. Temperature control is through a Barber-Coleman Microtherm unit which may be set for hot or cold rolls. The unit allows the water to be heated or cooled, depending upon the roll condition. This temperature control arrangement is one of the important advantages of this type of mill in controlling size.

Experience to date with carbide rolls may be summarized as follows: The initial cost of carbide rolls is higher than steel or chromium-plated rolls. Carbide rolls are more difficult to grind and polish. Greater care must be exercised during the polishing operation to insure perfect concentricity and balance. Closer control of roll temperature is necessary to prevent cracking of carbide rolls containing a steel core. Carbide rolls possess the desirable characteristics such as extreme hardness, greater strength, resistance to wear and resistance to corrosion. The life of these rolls is far beyond that of hardened or case hardened steel.

Greater speed is possible with carbide rolls. Speeds of 1200 fpm may be obtained when soft alloys are being rolled. The optimum speed is, to a great extent, influenced by the hardness of the material being flattened. Flying micrometers and constant tension control devices are advantageous with the higher speeds. Dimension tolerances may be held closer with the use of carbide rolls. The finish obtainable on carbide rolls produces ribbon with a mirror surface and additional polishing or buffing is unnecessary. The type of finish, whether dull or bright, may be controlled, to some extent, by rolling with oil or dry rolls. Carbide rolls produce less wasted material due to deviation from dimension tolerances, surface defects, waviness, rough wire, etc. Less downtime on the machine is made possible by the longer wearing rolls.

German Wartime Technical Developments

REPORTS of German practice in various technical fields of interest to engineers and executives in the metalworking field, issued by the Office of Technical Services, Washington, are briefly described below. Copies of the reports listed below may be obtained in either photostat or microfilm form, as indicated. Orders for copies of these reports should be addressed to Office of Technical Services, Department of Commerce, Washington 25, D. C., giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, Aug. 29, p. 39, Sept. 26, p. 80, Oct. 10, p. 67, Nov. 14, 1946, p. 81, Jan. 9, 1947, p. 64, Jan. 16, p. 53, Mar. 6, p. 70, Apr. 17, p. 57, July 3, p. 66, and July 31, p. 62, for a list of earlier reports.

Forging and Heat Treatment—German steel control authorities ordered the use of a specific method of treatment of alloy steel forgings to increase output. The report tells how hot forgings at a temperature above the upper critical point were charged direct into the hardening furnace at 840 to 900°C depending on analysis. A trend toward hydraulic presses incorporating the latest designs for forging work is also described. *PB-75883; microfilm $2.00; photostat $5.00; 73 p.*

Casting Industry—Two reports on the German castings industry are concerned with centrifugal castings as used in the production of cast iron pipe, cylinder liners and piston rings, and the light castings manufacturing industry. Detailed descriptions are presented on cast iron and steel cylinder liners produced in chill molds on horizontal axis centrifugal machines, cast iron cylinder liners produced on horizontal axis machines in sand lined molds, and steel castings produced on vertical axis machines in sand molds and chill molds. The second report on the light castings industry also contains detailed information. *PB-63856; microfilm $2.00; photostat $6.00; 90 p. PB-65665; microfilm $3.00; photostat $10.00; 141 p.*

Tungsten and Molybdenum Wire—Manufacture of tungsten wire in Germany involved pressing tungsten powder, presintered and sintered. The sintered bar was then hot swaged to rod and wire, and the wire hot drawn. Two types of wire were being produced, one suitable for vacuum lamps and single-coil gas-filled lamps, and the other for coiled gas-filled lamps. A section of the report describes the methods for producing pure tungstic oxide from scheelite ore containing molybdenum. *PB-18785; microfilm 50¢; photostat $2.00; 17 p.*

Electrodes and Flux Welding—Specifications for more than 60 German electrodes are included in a report on arc welding. German application of an American automatic flux welding process are described in a second report describing modifications of the Unionmelt automatic flux welding process. German electrodes were modifications of conventional types designed to conserve supplies of critical materials. *PB-58368; photostat $7.00; microfilm $2.00; 95 p. PB-63838; photostat $5.00; microfilm, $2.00; 69 p.*

Metal Powders—Highly intricate dies employing a number of independent punches fitted in die sub-press were used by the Germans in pressing rifle and gun parts from powdered metals, according to this report. Iron powders were also used for porous iron bushings, bearings, sliding parts, gears, bullet slugs, precision parts for rifles and diamond impregnated iron lapping wheels. The entire assembly was designed for use in a standard type of hydraulic press with top and bottom rams which eliminated the need for complicated presses with multiple die movements, the report states. Another report contains notes on German iron powder production methods. *PB-63874; microfilm $4.00; photostat $11.00; 152p. PB-63610; microfilm $1.00; photostat $2.00; 19 p.*

Aluminum—Production of aluminum from clay and methods used at several large aluminum plants for making aluminum from bauxite are described in three reports on German extraction of alumina and production of aluminum. The reports give the highlights of all processes attempted or in use in Germany and cite parallel research in the United States. *PB-57501; microfilm $1.00; photostat $1.00; 13 p. PB-60889; microfilm $1.00; photostat $2.00; 24 p. PB-75821; microfilm $1.00; photostat $3.00; 33 p.*

Modern Paint Removers

◦ ◦ ◦

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◦ ◦ ◦

WHILE there is no such thing as a universal paint remover, the development of effective paint stripping compounds, particularly during the war years, permits, if it does not require, a re-evaluation of available materials. By summarizing paint remover specifications used by the Army Air Forces during the war and disclosing certain heretofore unpublished data developed during World War II in laboratories, the authors hope to present information that will be helpful to the chemist or engineer who is confronted with a problem of selecting or specifying a paint remover.

Selection by the user of a paint remover is seldom easy since many variables have to be considered. Also, the number of individual raw materials to be removed runs into the thousands and the number of possible combinations and permutations is infinite. Other complications may include the method used to apply the paint and the curing technique such as slow air drying, infrared baking and oven baking. Each of these factors will modify greatly the problem of removing the finish. The composition and surface preparation of the base on which the protective coating has been applied may further complicate the problem. For example, the possibility cannot be overlooked that a highly alkaline paint stripper may remove an aluminum airplane wing from *beneath the paint* as easily as it removes the paint from the surface of the wing.

Developments in paint stripping compounds during the war years make particularly pertinent at this time a re-evaluation of available materials. This article summarizes air force specifications, discusses some basic considerations concerning the performance of various types of strippers and includes some previously unpublished data. The authors also present a number of helpful suggestions for expediting the removal of paint films.

Prior to and particularly during World War II, protective coatings received a great deal of attention in the laboratory. The new finishes resulting from research work were in many instances tougher and more corrosion resistant than the older coatings and presented new and difficult problems of removal. It is with finishes in common use during and since World War II that this discussion is particularly concerned.

In general, paint removal methods can be classified into two broad groups: (1) Mechanical methods involving scraping, sanding, burning with a blow torch, etc., or (2) solvent methods. This discussion is concerned only with the latter.

Solvent-type paint removers may be further classified into four subgroups:

(a) Strongly alkaline (water solutions) removers
(b) Organic solvents (no water) removers
(c) Emulsion-type removers
(d) Combinations of other types.

Type (a) removers are generally used in tanks. The articles from which the finish is to be stripped are hung in the hot solution until finish removal is accomplished. This type remover is usually limited to the alkali resistant metals or alloys. The three remaining types are usually applied by brushing or flowing although these removers can also be employed in tanks for special work. Their full effectiveness is best utilized to remove finishes from wood or the light metal alloys where corrosion is a problem.

During the course of extended studies on the latter three types it was found that paint removers act on paint films in at least four different ways:

(1) The paint binder may dissolve and form a solution with the solvent.

(2) The solvent may react chemically with the paint film and destroy it.

(3) Physical penetration of the paint film by the stripper may destroy the adhesive and cohesive properties of the film, thus facilitating removal.

(4) The solvent may penetrate the film by way of scratches and along broken edges, destroying the adhesion of the film.

Paint removers which depend on the last mentioned (4) means alone are, of course, not satisfactory since their action is usually too slow and irregular. Similarly, removers with only type (2) action are usually not compatible with a stable system. Experience has shown that for maximum, balanced stripping action the ideal paint remover will combine all four types of action, synergistically if possible. At the same time the stripper should possess many other desirable properties to be discussed later.

Much of the earlier research work was on brush-on type paint removers designed to strip tough finishes from military aircraft. Since some of the work was for the U. S. Air Forces the guides used were the Air Forces Paint Remover Specifications. The specifications summarized below represent a good cross-section of the Air Forces Specifications.[5, 6, 7, 8]

Evaporation—Early paint remover specifications required no higher rate of evaporation than the control formula. This was later changed[6] to read "The remover with free surface exposed to the open air shall not lose more than 5 pct of its original weight when maintained at room temperature (75°F ± 2°) for 24 hr." (With all other properties equal, the paint remover with the lowest evaporation rate is more desirable because the solvents have a longer time to attack the coating before vaporization occurs.)

Viscosity—The remover must possess the necessary viscosity to cling to vertical or overhead surfaces in a sufficiently thick film and thus permit the solvents to exert their full action. (Proper adjustment of viscosity and the other properties is discussed later.)

Rinsability—The spent remover and lifted paint films must rinse cleanly leaving no more residue than the control formula. After rinsing, the surfaces should be ready for refinishing.

Corrosion—Under normal service temperatures, the remover should not corrode or etch the basic metal. In a 48-hr corrosion test on steel and 168 hr on other metals such as aluminum alloy, aluminum coated aluminum alloy, tinplated steel and copper, the remover must not corrode the metal more severely than the specification control formula permits. On steel there must be no visible corrosion in 4 hr.

Nonflammability — A satisfactory paint remover must not support combustion at a temperature of 113°F or lower.

Stability—No changes should occur in the remover during storage or shipping which cannot be rectified by moderate shaking or stirring. No gas pressure should develop in the containers in 6 months.

In the research work on paint removers conducted at Wyandotte, aluminum alloy test panels were generally used. These panels were given one coat of zinc chromate primer and painted in accordance with Armed Forces Specifications. Unless otherwise mentioned all data refer to panels prepared in this manner. A major portion of the work comprised evaluation of solvents to be used as the base for the remover.

Cost is obviously an important consideration in formulating paint removers. This is borne out by the fact that a detailed survey of 150 patents, dating back to 1886, showed that low cost alcohols and benzene were used as the primary solvents in over 50 pct of the cases. Acetone was present in substantial quantities in about 35 pct of the formulas. While these materials have desirable properties for some applications, they are too slow in action to remove speedily the modern, more resistant finishes.

Chlorinated solvents[9, 10, 11] are generally included in the formula to improve the nonflammability of the paint remover. Only a few patentees[12, 13] consider them even mildly desirable; none places major emphasis on their importance and one patent[14] points out that their presence may actually be harmful. Nevertheless, studies of the relative stripping power of chlorinated hydrocarbons reveal that they may be very effective solvents if properly handled. However, among the chlorinated solvents there is a fairly wide variance in stripping power. Table I tabulates comparative stripping power of a number of chlorinated hydrocarbons.

Although some chlorinated hydrocarbons are good paint removers, it is desirable to increase their stripping power still further. This may be accomplished by adding substances which activate the chlorinated solvents. Water is a good activator and its marked effect on the stripping power of methylene chloride is shown graphically

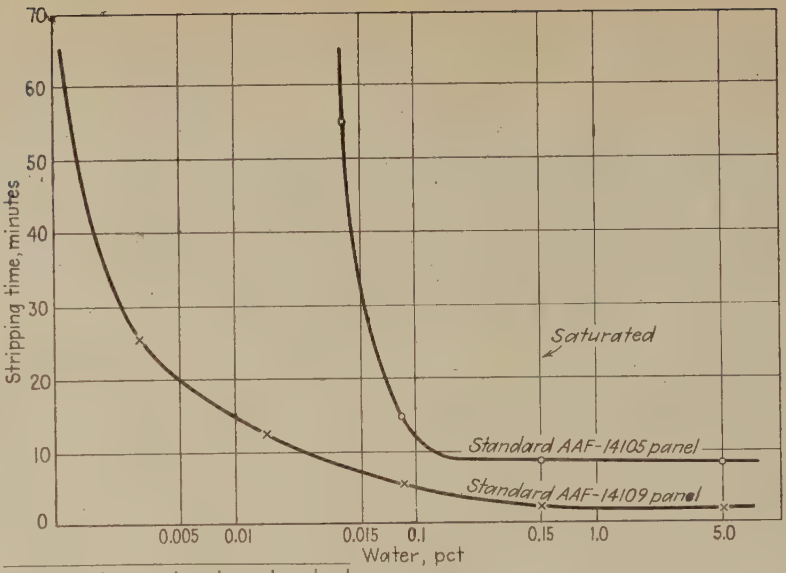
TABLE I

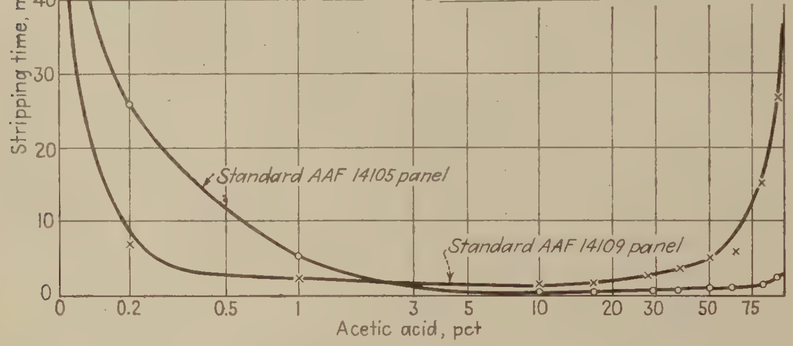
Stripping Power of Chlorinated Hydrocarbons When Incorporated in a Standard Laboratory Paint Remover Formulation

	Time to Remove Finish, in Minutes *
Methylene chloride	4.5
Ethylene dichloride	9.4
Trichlorethylene	12.4
Monochlorbenzene	12.5
Carbon tetrachloride	18.8
O-Dichlorbenzene	20.4
Propylene dichloride	29.1
1, 2, 4-Trichlorbenzene	46.2

BELOW

FIG. 2—Activation of methylene chloride with 100 pct glacial acetic acid.



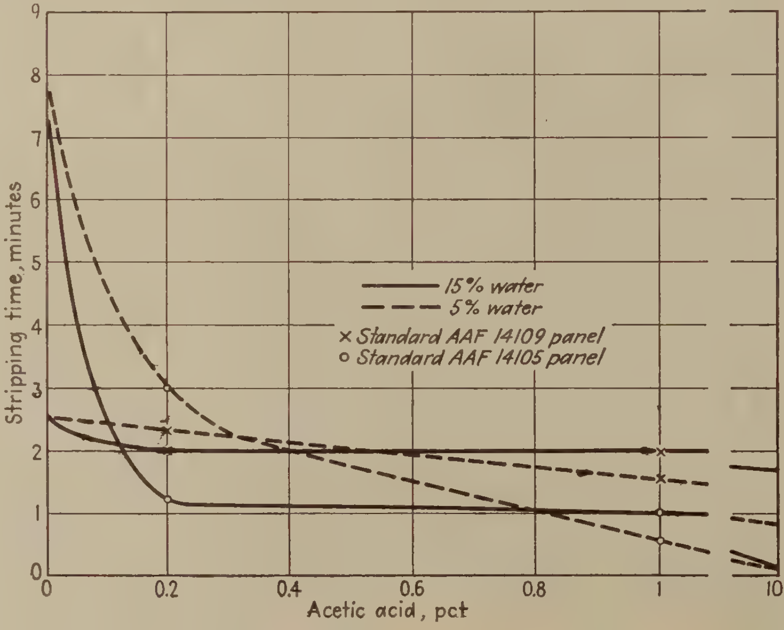


ABOVE

FIG. 1—Effect on stripping power of activation of methylene chloride with water.

BELOW

FIG. 3—Activation of methylene chloride containing water with 100 pct glacial acetic acid.



in fig. 1. At the point of saturation, in this case 0.15 pct water, the stripping power of the methylene chloride is at its peak. Thus the time to strip the finish is reduced from more than 180 to 8 min in one case and from 150 to 2½ min in the other. The activation ratio is therefore about 23 and 60 respectively.

Where acetic acid is the activator, the total time for stripping may be reduced still further. Fig. 2 gives results of laboratory tests for 100 pct glacial acetic acid. The activation ratio for acetic acid is much higher than water, being 1080 with a stripping time of 1/6 min for the AAF-14105 panel. A ratio of 113 with 1 1/3 min stripping time was obtained for the AAF-14109 panel.

Although, with water alone, stripping time is not as low as with glacial acetic acid, the percentage of acid necessary to attain fast action can be reduced by making use of the synergic effect of the water and acid acting together. For example, fig. 3 shows that for the AAF-14105 panels stripping time was reduced from 8 min with 0.15 pct water as the activator to 1 1/6 min by the addition of only 0.2 pct acetic acid. Similarly, the 2½ min stripping time for the AAF-14109 panel is shortened to 2 min. With 5 pct water present there is no practical advantage to be gained.

Unfortunately the chlorinated hydrocarbons which have excellent stripping power are also highly volatile. Consequently, to take advantage of their properties in industrial paint removers, the rate of evaporation must be greatly retarded. Wax is frequently used for this purpose. Its effectiveness is attested by a number of references in the literature to its use. Over 50 pct of the published formulations contain wax and its function has long been recognized.

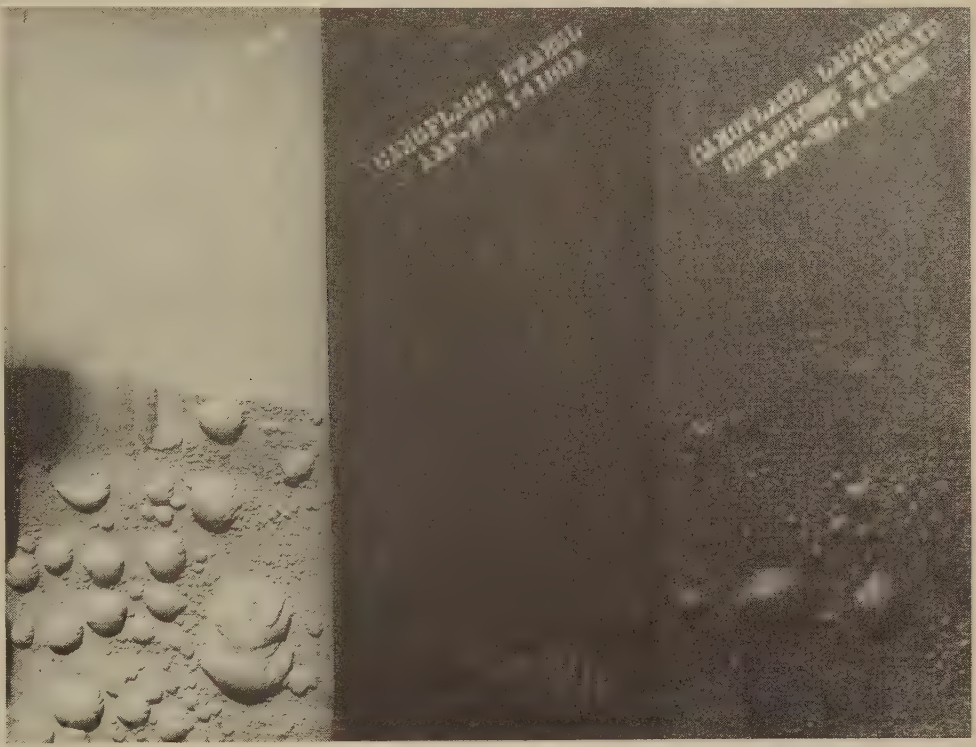
Unfortunately it has also been found that wax slows down the stripping action of many solvents. Two references give quantitative data on the evaporation retarding characteristics of wax.[15,16] It has been the experience at Wyandotte that ordinary paraffin wax is suitable, and the white material is preferred. Addition of even a small quantity, say 2 pct, is enough to permit the remover to pass most evaporation rate specifications.

However, too much wax in a paint remover may make it difficult to rinse from cleaned surfaces. This property may also be affected to some extent by the type of wax used. For instance, some of the white waxes result in a free-rinsing remover and also leave a minimum of residue on the surface after stripping. On the other hand, these waxes are not always compatible with the solvents present in good paint removers. Consequently, coupling and wetting agents are added to keep the wax well blended. Correct selection of such substances from among the better known materials, ethylene glycol mono butyl ether and petroleum sulfonate are representative, results in a clear, homogenous, stable product[3] with good rinsability.

Mixtures thus far discussed comprising chlorinated solvents, activating agents, evaporation retarder, coupling agent and wetting agent may yet be unusable because they lack the viscosity necessary to permit them to cling in thick films to vertical or overhead surfaces. As mentioned above, this is a necessary function of brush-on type paint removers. Substances suitable for thickeners are legion, with wood flour, starch, finely powdered inert materials, nitrocellulose and the cellulose esters being representative.

RIGHT

FIG. 4—The chlorinated hydrocarbon brush-on type paint remover applied to these test panels began to attack the paint before the brushing on the lower half was completed.



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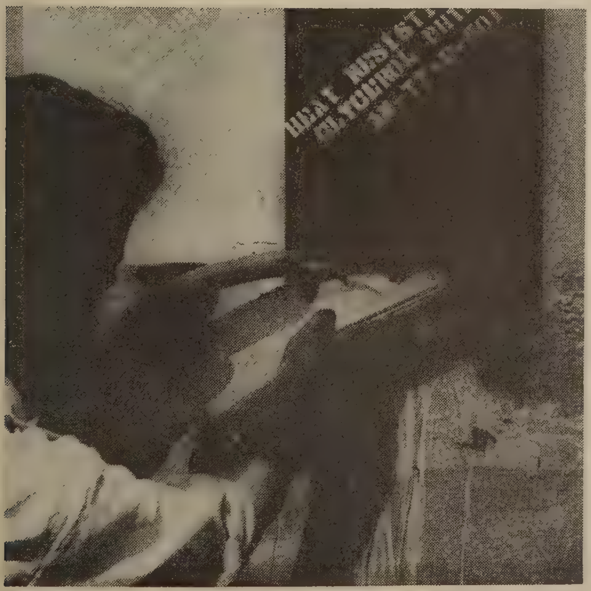
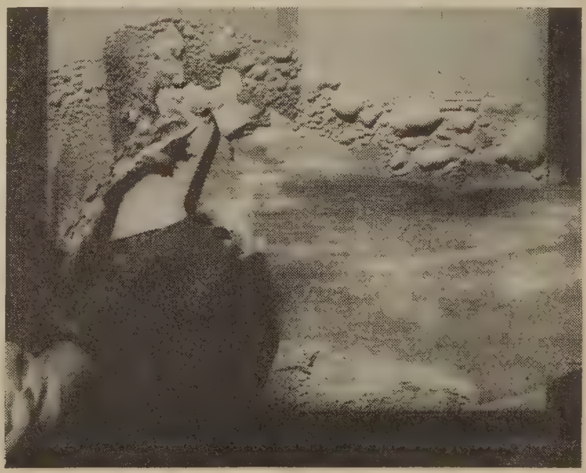
BELOW

FIG. 6—Another simple means of removing loosened film is the use of a scrubbing brush and hose, as shown here.



BELOW

FIG. 5—An effective means of removing a loosened paint film is the use of a paddle-shaped stick with a piece of belting tacked to the edge, as shown here.



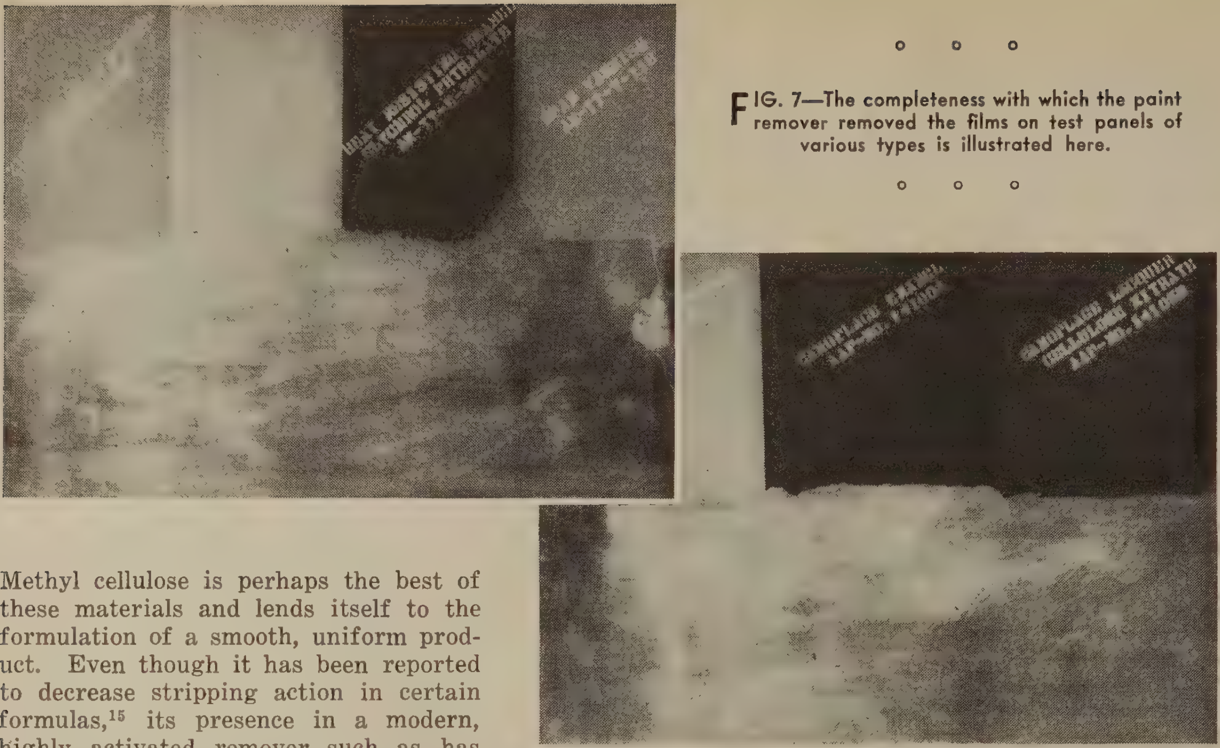


FIG. 7—The completeness with which the paint remover removed the films on test panels of various types is illustrated here.

Methyl cellulose is perhaps the best of these materials and lends itself to the formulation of a smooth, uniform product. Even though it has been reported to decrease stripping action in certain formulas,[15] its presence in a modern, highly activated remover such as has been discussed, causes little if any reduction in the stripping rate.

The ability of properly thickened paint removers to hang on to a surface is particularly important where there are a number of coats of paint to be removed. In some tests especially, when stripping old paint from boats, as many as 30 or 40 coats of paint may have to be removed. Here the thick film maintains a gross quantity of remover in contact with the paint and penetrates a number of layers.

A carefully prepared paint remover such as the type discussed above will usually meet corrosion requirements easily on most metals in spite of a small acid content. Some difficulty may be experienced when removing the finishes from some types of magnesium and its alloys, but with normally careful rinsing no prohibitive corrosion need be anticipated.

A number of chlorinated solvents are nonflammable, and paint removers which are composed largely of these chemicals usually meet the specifications for nonflammability. If, however, alcohols or other highly volatile organic solvents are present, their low flash point must be carefully considered. In some laboratory experiments on the flash point of alcohol-containing removers, inordinately low values were obtained. The depression in flash point temperature was found to be caused by the alcohol fumes collecting and igniting at the surface of the remover sample. In view of this situation it became necessary to adjust the alcohol content carefully. Fortunately, the permissible range of alcohol content is wide enough to permit formulation of a good commercial paint remover within workable limits.

Paint removers which are compounded with full recognition of the foregoing points are quite stable for long periods. When methyl cellulose is the thickening agent, the viscosity increases rather rapidly for a short time and then very slowly for an indefinite period. It is necessary to adjust the quantity of methyl cellulose so that the viscosity following the initial increase will remain within the desirable range.

To show more clearly typical applications and action of a chlorinated hydrocarbon brush-on type stripper, the accompanying series of photographs is included. The tests were made at the Wyandotte laboratories.

Two sheets of aluminum 3x4 ft in size were given a coat of zinc chromate primer (Specifications No. AN-TT-P-656). One sheet was divided into three and the other into four sections for painting. One section on each panel was given no further treatment. The sheets were then coated with lacquer and enamel.

A chlorinated hydrocarbon brush-on type paint remover was readily applied as in fig. 4. It will be noted that the remover began to attack the paints even before the brushing on the lower half of the sheet was complete. Fig. 5 shows one method which was found advantageous in removing the loosened paint films. The paddle-shaped stick in the man's hand is merely a thin board with a section of rubber belting tacked to the edge. This paddle provides a more durable and efficient tool than a regular window cleaning squeegee which was found to be too flexible.

An easy means of removing the loosened films is a scrubbing brush and water as shown in fig. 6. Both methods have been used with the preference being determined by the consumer and governed by numerous practical factors. The appearance of the sheets in fig. 7 shows the completeness of removal. It may be mentioned that the demonstration was performed on a very warm day, a thermometer held in contact with the aluminum registering 110°F.

Fig. 8 shows the ease with which the finish was removed from a standard steel storage cabinet. Again the squeegee method left the metal clean and ready for refinishing.

Fig. 9 illustrates how thoroughly one application of stripper removed a very heavy coat of Navy gray paint and undercoat (s) of varnish from the handrail of a 54-ft patrol craft. Of course, where 30 or 40 coats of paint are encountered with resultant thicknesses up to a quarter of an inch, more than one application of remover will be necessary.

Today, the properly compounded chlorinated hydrocarbon paint stripper is highly effective on many types of finish. However, paint technology is by no means static, and tomorrow's paints may require an entirely new type of paint remover. For this reason, researches such as those described above will be essential if effective development work on paint strippers is to keep pace with advances in paint technology.

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[16] J. M. Weiss, Ind. Eng. Chem. 19, 485-7 (1927).

* Average time to remove completely four different finishes; AAF 14105, 14109, auto blue and auto white.

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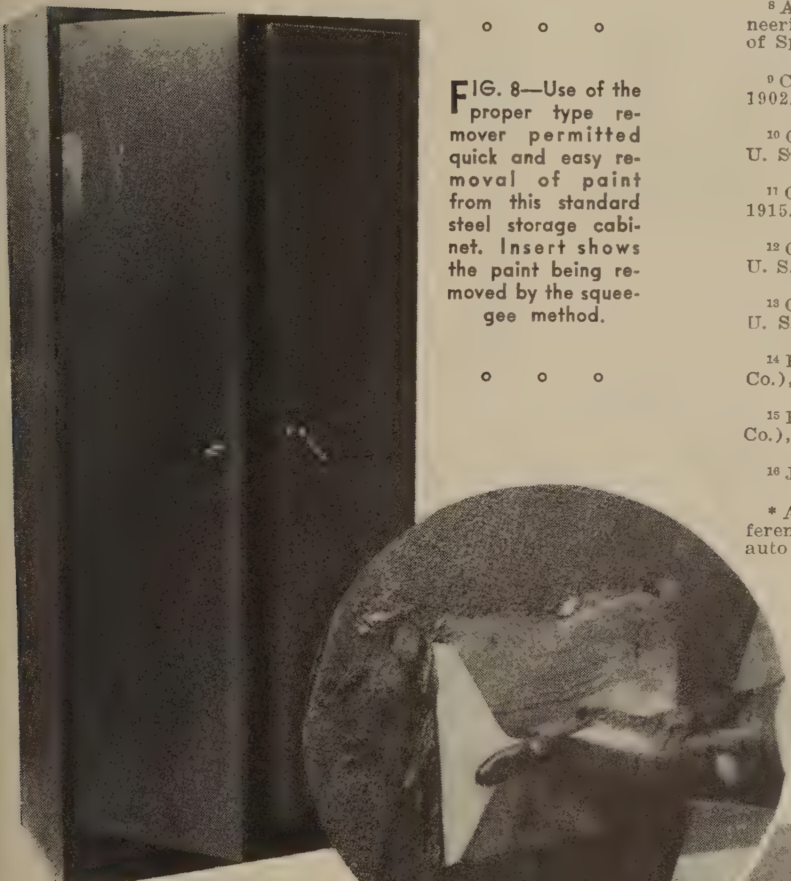
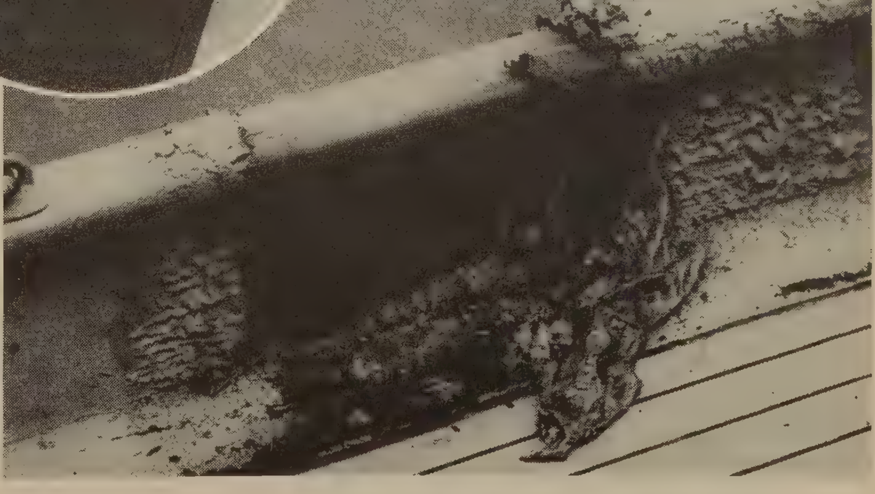


FIG. 8—Use of the proper type remover permitted quick and easy removal of paint from this standard steel storage cabinet. Insert shows the paint being removed by the squeegee method.



AT RIGHT

FIG. 9—One application of paint stripper was effective in removing a very heavy coat of Navy gray paint and undercoats of varnish from the handrail of a marine craft, as shown here.

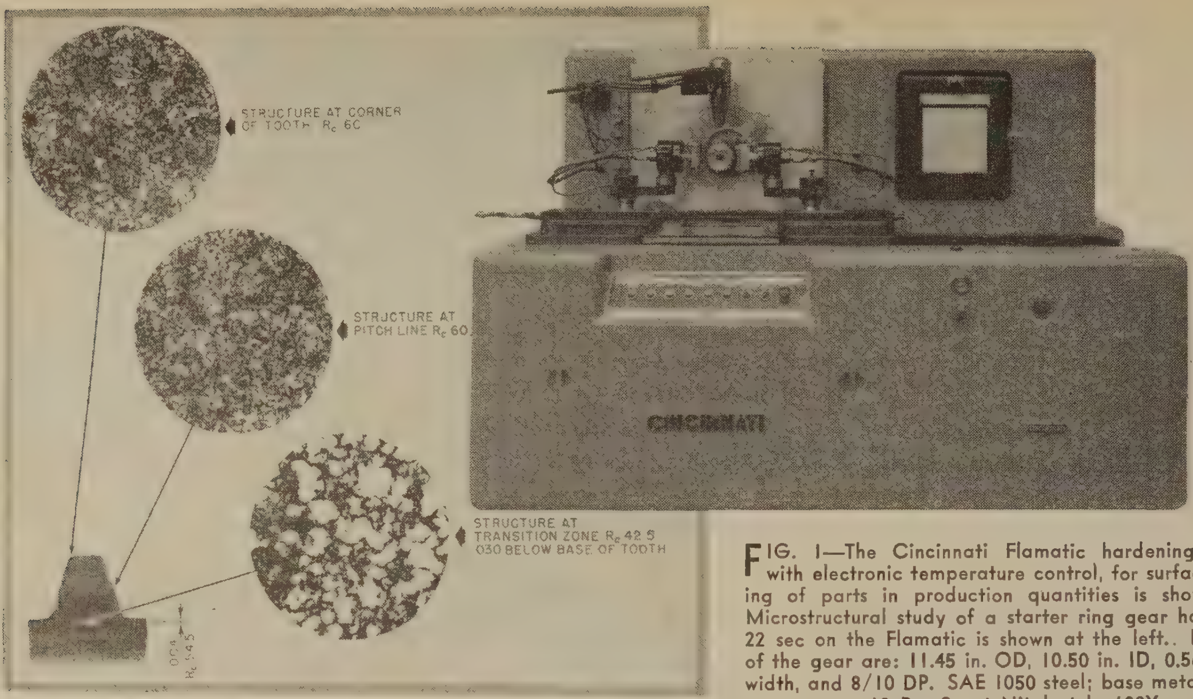

STRUCTURE AT CORNER OF TOOTH R_c 60
STRUCTURE AT PITCH LINE R_c 60
STRUCTURE AT TRANSITION ZONE R_c 42.5 .030 BELOW BASE OF TOOTH
.094
R_c 45
CINCINNATI

FIG. 1—The Cincinnati Flamatic hardening machine with electronic temperature control, for surface hardening of parts in production quantities is shown above Microstructural study of a starter ring gear hardened in 22 sec on the Flamatic is shown at the left.. Dimensions of the gear are: 11.45 in. OD, 10.50 in. ID, 0.560 in. face width, and 8/10 DP. SAE 1050 steel; base metal hardness 18 Rc; 2 pct Nital etch; 600X.

New Surface Hardener Combines Precision and Speed

A NEW development employing flames for surface hardening of parts in production quantities, has recently been announced by the Cincinnati Milling Machine Co., Cincinnati. The machine incorporates a number of improvements in flame hardening techniques, and holds parts within dimensional tolerances and to metallurgical specifications said to be hitherto impractical with the flame method.

Most important feature of the "Flamatic" illustrated in fig. 1 is the electronic temperature control system, which permits rapid heating of parts to a desired preset temperature, followed by an oil quench. It is claimed that the surface temperature at the instant the part enters the quench is held within ±5°F of the desired value in the critical transformation range.

Rapid heating makes it possible to confine the heat to the surface of the part, leaving the core relatively cool, and permitting core properties to be established by previous heat treatment. Uniform depth of heat penetration is achieved, which factor, combined with the oil quench, results in negligible distortion. Some typical results obtained in hardening ring starter gears.

Equipped with standard flame heads, the machine is unusually adaptable, and has been used successfully to harden gears, shafts, barrel-type cams, pinions, and other parts that lend themselves to rotation. With special flame heads and work holding fixtures, the machine will accommodate a wider range of parts. In general, the range of parts includes shafts up to 18 in. long, and parts with diameters up to 8 in. with correspondingly smaller lengths.

The machine is 7 ft 8½ in. wide, 5 ft 5 in. deep, and 5 ft 6 in. high, and weighs 8500 lb ready for operation. Basically it consists of a work table built over a conveyorized quench tank, flame head assemblies adjustably mounted on the work table, and a spindle to which a work holding device is attached, centered between the flame heads.

Operation is fully automatic except for loading of parts. The operator places the work piece on the holding fixture, presses the automatic cycle start button, and the cycle is completed without further action by the operator. The spindle starts rotating, the flames are ignited, and the surface of the part is heated to the preset temperature. At this moment the flames are extinguished, the spindle stops rotating and retracts, stripping the work piece off the holding fixture and into the quench tank. The operator can then place another part in position for the next cycle. Manual handling of parts and operator fatigue are thus reduced to a minimum, and high productivity is maintained. A convenient push button control panel gives the operator full command of the machine at all times.

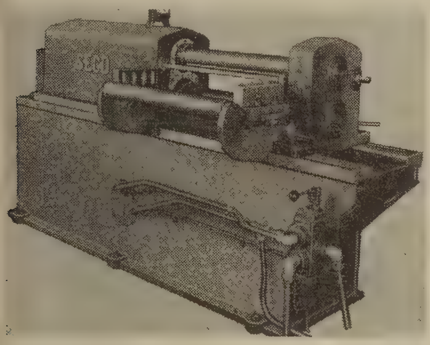
The conveyor in the quench moves a preset distance at the beginning of each cycle, clearing a space to receive each piece and insuring against damage to parts in the quench. Processed parts are delivered by the conveyor to a take-off plate at the end of the machine, where they may be collected or picked up by another conveyor.

New Equipment . . .

Recent developments in a hydraulic slitting line, automatic pinion turning machines, drilling and tapping machines and several machine tool attachments are discussed in this week's review. A punch holder remover, magnesium bottom boards, strip expander, and nonferrous metals coloring compound are among other miscellaneous items described.

Hydraulic Slitting Line

A SLITTING line, operated entirely by hydraulic power has been designed and built by the *Steel Equipment Co.*, 2890 E. 83rd St., Cleveland 4. It is said to give perfect control over a speed range from zero to maximum slitting speed, plus unusual tension regulation. All units are driven by fluid motors, hydraulic power being supplied by one hydraulic pumping unit using a variable delivery pump driven by a constant speed ac motor. Volume control permits the operator to bring the speed down for threading-in operation at 35 fpm. The line can be accelerated to top speed or slowed down without use of any brakes. Tension regulation of the recoil reel is accomplished through pressure control. All coil handling equipment is operated by means of hydraulic cylinders.

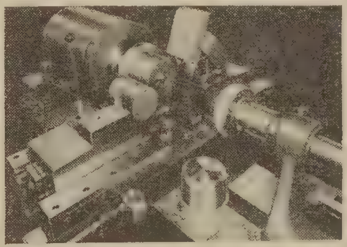


High-Speed Drilling Machine

A NEW drilling and tapping machine announced by *Sibley Machine & Foundry Corp.*, South Bend, Ind., has a 20-in. swing and is recommended for use as an all-purpose machine. It is designed for sensitive drilling and tapping operations at high speed. A 2-hp motor furnishes power to drill 1½ in. in mild steel. Eight spindle speeds are available as follows: In back gear 65, 95, 150 and 225 rpm; in direct drive 400, 575, 900, and 1360 rpm. Feeds are 0.003 in., 0.006 in., and 0.010 in. This machine features a double ball bearing spindle assembly.

Spinning Lathe Attachment

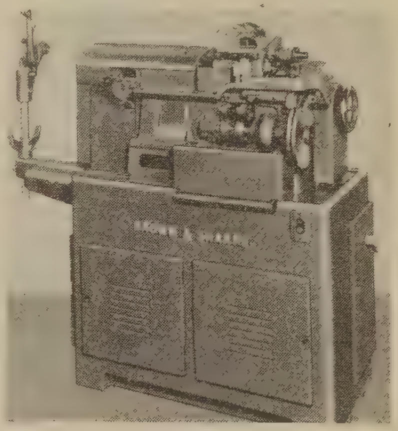
HAVING operation arranged in an automatic cycle with push button starter, a hydraulic cross-slide attachment for second operation spinning lathes has been announced by *E. W. Bliss Co.*, 450 Amsterdam, Detroit 2. It is specially constructed to eliminate operator fatigue, and insure part consistency in trimming, beading, curling or wire rolling operations. It is timed to enable trim cutters in the rear of the attachment to move in on the part and trim the edge. The cutters, upon completion of their work, automatically retreat allowing the beading or curling attachments their turn at the part.



Shell removal and the next installation follow. All strokes and positions of the slide are controlled by adjustable dogs. The power system includes speed and feed adjustment.

Pinion Turning Machine

SIMPLICITY of setup duplication is one of the features of the new automatic pinion turning machine introduced by *Brown & Sharpe Mfg. Co.*, Providence 1. Other advances include exclusive circular-formed single-point tools, built-in tool resetting indicator and centering gage, and individual micrometer stops for each of the 8 tool positions. Only 2 cams are employed in the drive mechanism, both mounted close together on the same drive shaft to eliminate torque distortion. As much as 4:1 ratio of cam lobe rise to longitudinal feed further increases accuracy.



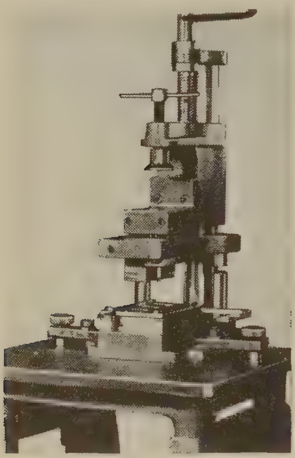
Uniformly rapid automatic movements, regardless of time required to make a part, are insured by a constant speed drive shaft. Change gears provide rates of production from 3 to 364 sec for one piece per cycle. The machine has 16 spindle speeds, from 10,000 to 910 rpm, takes stock to ¼ in. diam and turns up to 2⅞ in. length. Drive is by a 2 hp speed motor mounted inside the base.

Metal Stitchers

MACHINES which have been designed by *Acme Steel Co.*, 2840 Archer Ave., Chicago 8, to replace riveting and spotwelding in the fabricating of light metal, stitch metal to metal, or to nonmetallic materials such as rubber, asbestos and leather. No prepunching or cleaning of parts to be stitched is necessary as the wire acts as a punch and punches out a clean slug as the stitch is driven. Stitches are formed from a continuous length coil.

Punch Holder Remover

ANNOUNCEMENT of a punch holder remover has been made by *Producto Machine Co.*, Bridgeport 1, which facilitates the removing of die punch holders from die beds with guide pins, and the separation of assembled punches and dies. In addition it may be used for shearing in small punches and dies and tryout work on light gages of material. Punch holders are quickly and easily removed, it is said, avoiding damage to punches and dies, with considerable saving of diemaker's time.



High Speed Drill

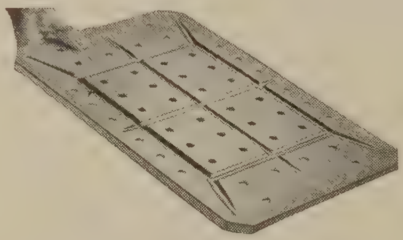
MODEL 7022 high-speed air drill introduced by *Aro Equipment Corp.*, Bryan, Ohio, has been designed for use on small drilling applications in wood and nonferrous metals and for cleaning stamping dies and molds. The tool has a speed of 26,000 rpm and is equipped with 0 to ¼-in. chuck and lever throttle. It accommodates twist drills from 0 to ¼-in. shank size. Its high speed will clean but is not powerful enough to remove metal, therefore die dimensions are not affected. The drill is adaptable for multiple mounting in jigs or fixtures where more than one hole must be drilled simultaneously.

Strip Expander

AN expander for leather cup packings produced in strip form has been announced by *HPL Mfg. Co.*, 2013 E. 65th St., Cleveland 3. It is made of a specially heat-treated beryllium copper strip material that is highly impervious to corrosion from brine solution, gasoline, alcohol, sea water and many other solutions. The strip expander for air-hydraulic, fluid sealing or any other sealing problem, is designed to maintain constant contact between packing seal lip and cylinder wall on all pneumatic and hydraulic equipment. The expander is designed to fit any cup diameter 2 in. and over and it is merely necessary to insert a suitable length of the expander between the clamping plate and the packing seal to get the required pressure on the packing lip for the installation.

Bottom Boards

DOWMETAL bottom boards have been announced by *Edw. S. Christiansen Co.*, 1 N. LaSalle St., Chicago 2. Made of magnesium, they weigh substantially less than wood, yet possess durability of better-than-average wood boards. It is claimed that they are considered permanent foundry equipment because of their extreme resistance to heat and ability to withstand normal run-outs and spills of molten metal; they will not warp or break. They can be used as a combination squeezer and bottom board, offering firm, equal distribution of pressures. A special vented design permits escape of gases, reduces rejects, and helps retain sand permeability, thus maintaining a high, uniform quality of castings.



Liquid Coloring Composition

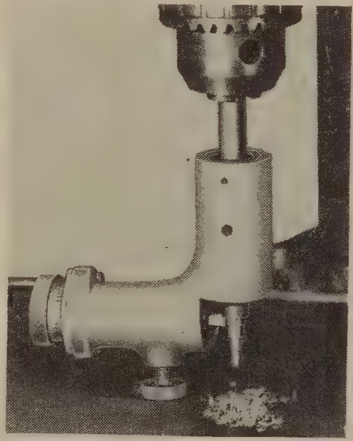
DEVELOPMENT of a liquid coloring composition for coloring nickel, brass, copper, aluminum and zinc diecastings has been announced by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. The product is known as Acme grade 4-L-10. It is said to clean up fine on the work, leaves the face of the buff soft and clear and it does not clog fluid lines. Acme 4-L-10 is recommended for use with pressure type composition spray equipment.

Bearing Protection System

WARNING when bearings start overheating is the function of an automatic, multipoint bearing temperature monitoring system developed by the *Instrument Div., Thomas A. Edison, Inc.*, Lakeside Ave., West Orange, N. J. The system is said to be adapted both to principal equipment and auxiliaries in power generating stations, gas plants, pipe line substations, and general industrial operations. As many as 24 bearings can be monitored from each central control cabinet. The unit employs electric resistance bulbs which are 0.215 in. in diam and are mounted in small holes drilled in the bearings. The temperature of each bearing is checked automatically every two minutes and if the temperature exceeds an established maximum, an alarm is sounded. The actual temperature of a bearing may be read by plugging an electrical thermometer which is built into the central control panel into the appropriate jack.

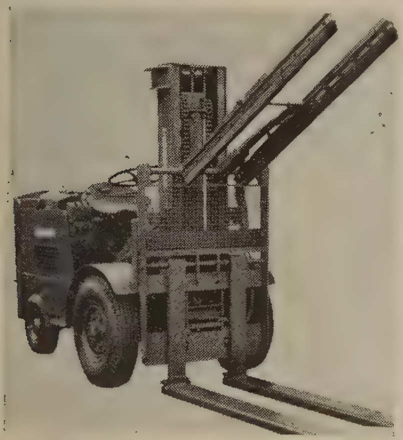
Turning and Cutting Tool

ANNOUNCEMENT of a metal turning and cutting tool known as the Tru-Turn which has been developed to convert drill presses, woodworking lathes and grinder stands into precision metal working lathes, has been made by *Millholland Screw Products Corp.*, 130 W. 13th St., Indianapolis 2. This tool has a built-in micrometer providing accuracy to 0.001 in. It is said to handle ½, ⅜ and ¼-in. brass, aluminum and steel bar stock, and turns multiple diameters. The tool is provided with ⅜ and ¼-in. guide bushings and three precision ground bits.



Lift Truck Clamp Arm

A CLAMP arm accessory for fork lift trucks which is designed to prevent shifting or slipping of large flat loads while being transported or stacked is now marketed by *Towmotor Corp.*, 1226 E. 152nd St., Cleveland 10. The attachment consists of a set of clamp arms which are hydraulically operated to grip the load. The suction is controlled by means of a valve adjacent to the operator. Both arms are equipped with a layer of sponge rubber along the bottom edge to assure a firm grip without damaging materials handled. As installed on a Model LT-60 Towmotor fork lift truck, it is claimed that loads up to 4000 lb are easily lifted to the full 114 in. of lift provided on the unit.

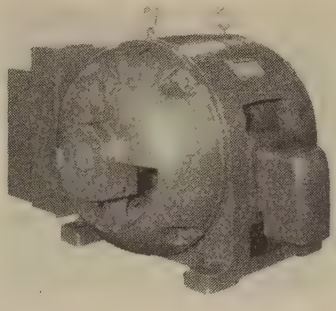


Current Transformer

DESIGNED for both relay and meter work, a new type CT-2.5 current transformer announced by *Westinghouse Electric Corp.*, Pittsburgh 30, has class 0.3 accuracy with B-0.1, B-0.2, and B-0.5 burdens, the highest standard recognized by the American Standards Association. Impulse strength has been increased in the new line to 45 kv as added protection against lightning and switching surges. Available for indoor use in the 2.5 kv class of insulation for operation on circuits of 2890/5000 or less, the transformer is produced in ratings from 10 to 800 amp with a full-load secondary current of 5 amp in all sizes.

Frequency Converter

A POWER supply for high-speed ac motors used for applications on grinders and drills has been announced by the *General Electric Co.*, Schenectady 5. Called the Tri-Clad type AKC inductor frequency converter this self-excited, self-driven machine provides 3-phase power at frequencies from 360 to 2160 cycles, ½ to 150 kw. The stator is built in a standard induction motor frame and has two windings. The input winding operates at standard line frequency and serves to drive the rotor as an induction motor and supplies the excitation for the high-frequency winding. The secondary winding is the generator winding, in which high-frequency voltage is generated.



Thread Protector

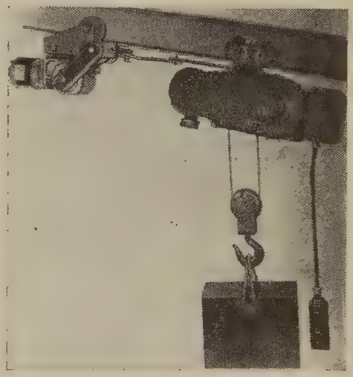
A NON-METAL thread protector, made of a new process rubber-plastic compound, has been announced by *Paulus Inc.*, Helen and Robb Sts., McKees Rocks, Pa. The protector is for drill pipe and casing and results in labor savings on disassembly, the manufacturer says. It can be reclaimed; meets requirements of industry on abrasion and impact tests; withstands maximum and minimum heat conditions.

Lubricating Compounds

KNOWN as the Glycolube series, lubricating compounds developed as lubricants for drawing, sheeting and stamping nonferrous metals are being manufactured by *Glyco Products Co., Inc.*, 26 Court St., Brooklyn 2. Glycolubes, said to make possible increased operating speeds and prolonged life of the dies with which they are used, are said to result in a brighter product, automatically apply a film which acts as a temporary corrosion inhibiter, and permit continuous lubrication. They do not break down during operation or produce scum, it is claimed, thereby eliminating the necessity for continually renewing or discarding the lubricant. They are available in various forms, ranging from liquids to solids and from water-soluble or water-dispersable materials to oil-soluble materials. One compound in the series of 12 compounds is both water and oil dispersable.

Motor Traveled Tractors

FEATURING what is said to be a new idea in traction effectiveness, the Trojan, electric motor traveled, monorail tractor has been introduced by the *Detroit Hoist & Machine Co.*, 8226 Morrow St., Detroit 11. This tractor suspended on a pair of wheels that run on the top surfaces of an overhead, monorail beam flange, is so fulcrumed that its own weight exerts a pressure against a second pair of wheels which run on the underside of the flange. The result is a biting action that permits a relatively small, compact lightweight tractor to travel comparatively heavy loads even up inclined monorails. The Trojan tractor can be applied to travel existing hand operated monorail hoists by power, to travel monorail conveyer lines, and to open and close heavy doors.



Line Marker

OFFERED for factory and warehouse use in marking and zoning plant floors, a line marker manufactured by *Newaygo Engineering Co.*, Newaygo, Mich., rolls paint on surfaces from a marking wheel which is fed from a reservoir tank. Lines may be marked to within 1½ in. from walls or machines. The paint tank has a capacity of from 4 to 5 gal and paint is held at a fixed level in the reservoir in front of the tank by vacuum. The paint is picked up by an idler wheel and spread on the marking wheel, the amount of paint being regulated by turning a thumb nut. The marker wheel is 3 in. wide.

Strength Tester

A 100-lb universal tester that handles specimens in tensile and in compression has been marketed by *W. C. Dillon & Co., Inc.*, 5410 W. Harrison St., Chicago 44, This compact, lightweight instrument can be hand-held for operation and cannot be injured by accidental overload or shock recoil, it is said. It handles tensile specimens 1¾ in. wide x ⅛ in. thick. In compression it will handle steel, aluminum, brass, plastics, and adhesives.

Respirator Dust Filter

A RESPIRATOR incorporating a new type dust filter for protecting industrial workers exposed to poisonous and disease-producing dusts smaller in diameter than 24 millionths of an inch has been announced by *Amercian Optical Co.*, Southbridge, Mass. The new filter consists of a felt which has been chemically treated so that its ability to prevent the passage of dust is claimed to be 40 times greater than untreated filters. It is ⅛ in. thick and slightly over 5 sq in. in area, equivalent in dust filtering efficiency it is claimed, of untreated filters of the same thickness and 42 sq in. or more in area. Its increased efficiency is said to be accomplished without a proportionate increase in breathing resistance. The filter is equipped with a gauze prefilter for catching larger particles of dust and dirt. The respirator and filter have been approved by the U. S. Bureau of Mines.

Stamping Machine

INTRODUCED by the *Acromark Co.*, 328 Morrell St., Elizabeth, N. J., a name plate stamping machine is said to stamp up to ½-in. size letters and figures into soft aluminum and up to ¼-in. size characters in steel. The machine is claimed to be three times faster than former models and adaptable for stamping parts and name plates up to 2⅛ in. thick. This permits stamping on name plates after assembly if overall thickness does not exceed the above limit. Overall height of the unit is 54 in. including pedestal, from floor to top of die wheel. Depth from front of worktable to back of frame is 16 in. Depth of throat is 7½ in. to permit parts or name plates to be stamped 7½ in. from the top. A clamping arrangement released by a thumb lever holds the parts in stamping position and the die wheel carries all letters and figures with extra required characters. Feed is automatic with each upstroke of foot pedal, and a handle is provided.

Preplated Metal Pattern

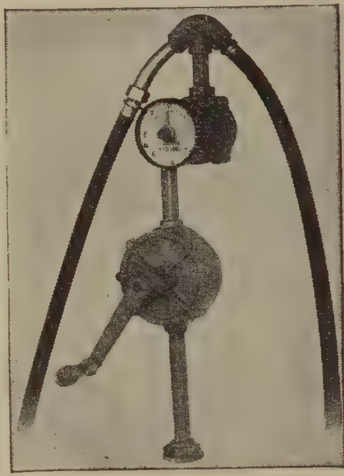
CALLED Crimp Metal, a new preplated metal pattern, introduced by *American Nickeloid Co.*, Peru, Ill., is available in coils in steel base metals up to 0.015-in. gage and in zinc base metals up to 0.018-in. gage. The pattern consists of a round embossing, raised or depressed, on the polished side of the metal, running parallel to the length of the coil. Embossed or debossed, the pattern is said to make a striking design and increases the rigidity of the metal.

Plate Resistors

FOR use in electric motor controller and starter duty, the *Electric Controller & Mfg. Co.*, Cleveland 4, announces a line of non-breakable resistor-sections in which resistor-ends are off-set and spot welded together to form a continuous path throughout the section. Terminal-plates for external connections are also welded in place. Known as Tab-Weld plate resistors, the individual resistors are stamped in the form of grids from flat-rolled, corrosion resistant, chromium alloy steel, which has a negligible resistance-change between cold and maximum temperation. Terminal-plates for external grooves to accommodate several sizes of wire. Sections are available in several capacities and are of the same width, length and height.

Rotary Hand Pump

BUILT for fueling or dispensing of liquids up to 10,000 S.S.U. viscosity, a 10-gpm rotary hand pump developed by *Bowser, Inc.*, Fort Wayne, Ind., features an aluminum rotor, graphite-carbon vanes, cadmium plated packing nut and stainless steel springs. The meter registers to 8 gal and is equipped with a 9.999 gal totalizer. The unit includes a 40-in. suction pipe with bung attachment, 8 ft of oil resistant discharge hose and aluminum nozzle.

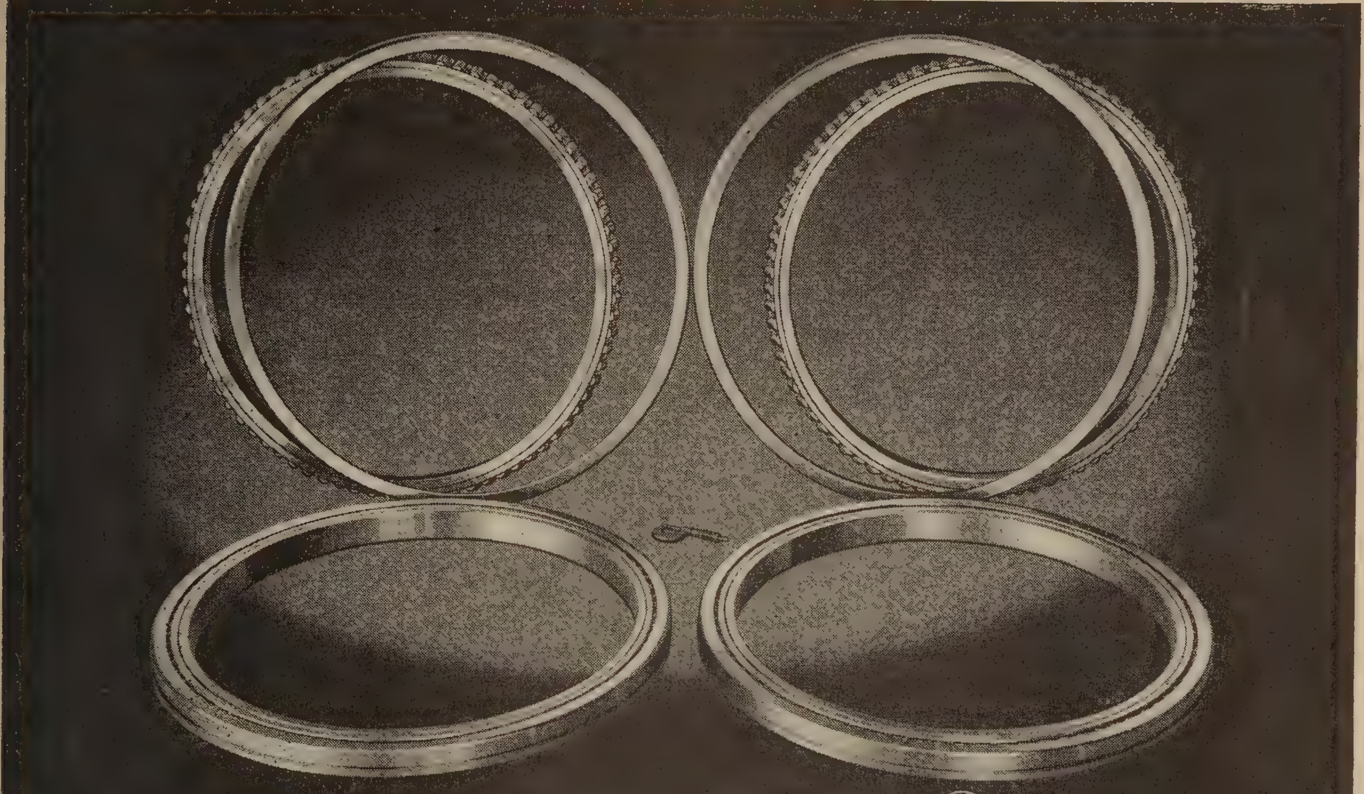


Automatic Motor Starters

DEVELOPMENT of ac automatic starters of the nonreversing autotransformer type and designed for use with single speed two or three phase squirrel cage induction motors, driving pumps, fans, M-G sets, compressors and other equipment, has been announced by *Ward Leonard Electric Co.*, 31 South St., Mount Vernon, N. Y. They have been designed particularly for use where inrush starting currents must be reduced or where motor starting torque requires adjustment. The drip-proof enclosed starter is arranged in three sections consisting of the contactor panel, timer panel and the multi-tap autotransformer. Adjustable time limit acceleration, overload protection, mechanical and interlock protection and adjustable taps on the autotransformer are provided on all starters. Starters are available in standard sizes for use with squirrel cage induction motors up to 100 hp, 550 v, 60 cycles.

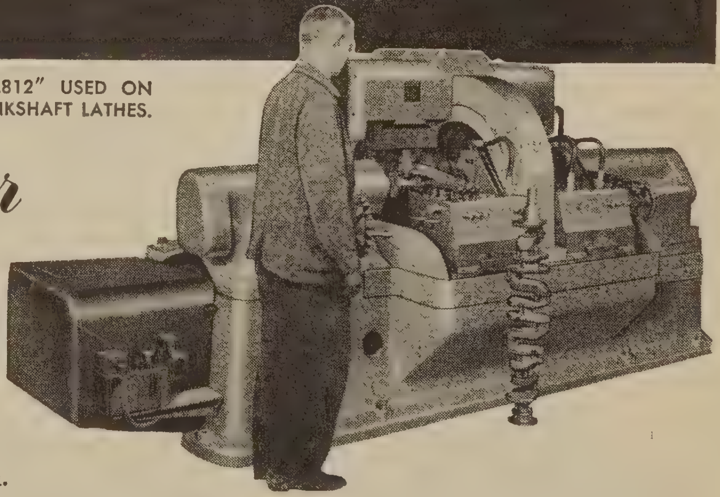
Contact KAYDON of Muskegon

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER



KAYDON TAPER ROLLER BEARINGS 24.500" x 28.875" x 1.812" USED ON WICKES BROTHERS CH-4 AUTOMATIC CENTER DRIVE TYPE CRANKSHAFT LATHES.

More and Better Crankshafts



THE turning of main line bearings on 8-throw automobile crankshafts is a "ticklish" high-precision job. Wickes Brothers Automatic Crankshaft Lathes turn out these crankshafts in mass production with absolute uniformity of precision.

There can be no compromise in quality of bearings for Wickes Brothers machine tools. **KAYDON** Thin Cross Section TAPER Roller Bearings, used in the center drive housing, reduce friction, assure smooth operation, and help maintain unfailing precision in the operation of these lathes.

In many industries **KAYDON** is helping engineers "make dreams come true" in new machines that produce more and better products.

* * *

Counsel in confidence with **KAYDON**. Capacity now available for all sizes and types of **KAYDON** Bearings . . . and for atmospheric controlled heat treating, precision heat treating, salt-bath and subzero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services.

KAYDON *Types of Standard or Special Bearings:*

Spherical Roller • Taper Roller
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Roller Radial • Roller Thrust

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Assembly Line . . .

WALTER G. PATTON

• Thomas will oppose Reuther in knock-down factional fight for UAW-CIO leadership . . . Ford discloses details of its recent contract negotiations . . . New Ford policy seen in recent move.

DETROIT — While R. J. Thomas, former UAW (CIO) president has not yet made a formal announcement, it is as obvious as daylight that he will oppose Walter P. Reuther, for the top union job at next month's convention at Atlantic City. Mr. Thomas' decision comes as no surprise and the bitterness of the factional fight in the UAW (CIO) has already reached practically a new high even for UAW (CIO) factionalism.

During the next month the Detroit papers will be filled with evidence of the schism that has torn the autoworkers' union for many months. In the next 30 days Mr. Reuther and Mr. Thomas will battle it out on the front page while an amazed public will be more than a little bewildered trying to determine what makes the UAW (CIO) union tick.

While the outcome of the UAW (CIO) convention in November is still anything but predictable, the fact that Mr. Reuther is quietly winning delegates that were formerly pledged to the Addes-Leonard-Thomas faction and that the anti-Reuther group this week hired a high-powered Chicago press agent to do its drum beating between now and convention time would indicate that the anti-Reuther faction is on the defensive at the moment.

In elections held thus far, Mr. Reuther has clearly had the better of the bitter battle for convention votes. Mr. Reuther swept the election of Local 400 at the Highland Park plant. During the past 2 weeks Mr. Reuther has also succeeded in reversing the results of the 1946 election at the Rouge Local 600 which has heretofore gone almost solidly for the Addes-Leonard-Thomas faction.

Perhaps the most enlightening discussion of the practical side of union politics was disclosed this week by John S. Bugas, vice-president and director of industrial relations of Ford Motor Co., who gave the members of the American Management Assn. in New York a ringside view of the Ford labor problem.

Commenting on the recent Ford negotiations, Mr. Bugas disclosed that the pension plan which was recently defeated at Ford was first talked about nearly 2 years ago. As soon as the company indicated it would attempt to work out a retirement plan, Mr. Bugas said, negotiations with the union became intensely complicated and difficult. As the meetings progressed it became evident there was a wide split within the UAW (CIO) negotiating committee and within the union itself on the desirability of a pension plan regardless of its adequacy.

THE internal factionalism and politics of the union was rampant at this stage of the negotiations, Mr. Bugas disclosed. No leadership within the union, he said, was strong enough to weld the factions together on the desirability of a pension plan. Finally, Ford proposed to offer the union two separate contracts to be voted on by the membership. The No. 1 plan containing the pension with a 7¢ wage increase; the No. 2 package contained the 15¢ labor wage increase.

The decisive defeat of the pension plan by the workers was attributed by Mr. Bugas to failure on the part of the union leaders to understand what the rank and file workers want.

"The union leaders who have long and vociferously maintained that they speak for the vast majority of the men in their union have not accurately done so," Mr. Bugas said.

It is Mr. Bugas' contention that the union leaders have not represented the real desires of Ford employees. As the Ford labor head sees it, union labor leaders have a real problem in communications.

"Labor leadership has equipped itself with ample devices for telling the membership what the leaders think," Mr. Bugas said, "but they have apparently fallen down in perfecting accurate devices for determining what the employees want."

Recalling the long period of negotiations between Ford and the union, Mr. Bugas said, "As we sat in those meetings day after day and night after night and watched the negotiating committee split sometimes simultaneously into several different camps on a single issue it was plain to the members of our negotiating team that the cleavage was taking place frequently along strictly political lines."

IT is Mr. Bugas' contention that two reasonable men of ordinary ability could have sat across the table from one another "in an atmosphere of mutual trust and respect, divorced from factionalism and politics," and could have negotiated the Ford contract in a week that required 4 months.

Mr. Bugas pointed out that opposition to the pension plan seemed to develop during the recent negotiations both from the extreme left and the extreme right factions within the union. Opposition from the right was attributed to the faction of a union official who had tried unsuccessfully to get a retirement plan from another automobile company. The opposition from the left Mr. Bugas attributed primarily to the Communists who, he said, had agitated for a pension plan just so long as they thought there would be none, but who reversed their field and opposed it fiercely as soon as pensions seemed to have some chance of becoming a reality.

Mr. Bugas also disclosed that the Ford negotiations were made more difficult because of the usual "ask-for-the-moon" demands of union leaders.

"There have been numerous occa-

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The A-B-C of Flexible-Shaft Finishing—*as seen at Chicago*

A new conception of flexible-shaft finishing *and the P&W engineering behind it* was gained by hundreds of visitors at the big P&W Booth at the Machine-Tool Show. They saw P&W Kellerflex Machines using P&W Carbide Burs, cutting everything from cast iron to hardened dies. They saw new versatility in the ever-broadening line of Kellerflex accessories . . . always in step with industry's needs.

They took with them the three booklets illustrated . . . A—the Kellerflex Machine and Attachment Catalog; B—the "Burology" Booklet which provides the basis of modern finishing practice; C—The Keller Bur and Accessories Catalog. If you missed them at the Show, write today for the A-B-C of flexible-shaft finishing—any or all three of the booklets. We'll be glad to get them on their way to you immediately.

PRATT & WHITNEY
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sions on which . . . conflict in the inner councils of the union has operated to defeat the aims and best interests of the wage earners," Mr. Bugas continued. From the point of view both of labor and management, this state of affairs is unfortunate, he said. "A house divided against itself cannot stand. Neither can it make contracts that will stand."

Mr. Bugas attributes the tremendous emotionalism of the union politics to a situation that is peculiar to labor unions. "Every issue on which the union official goes before the voters directly concerns the voters' bread and butter," he said.

In Mr. Bugas' opinion the result of this situation is an intense emotionalism in union politics which does not exist in any other political arena. Moreover, he contends, in some occasions it turns out that the voters are at the mercy of the union leaders rather than the leaders being at the mercy of the union voters.

Under the present setup, Mr. Bugas sees little hope that union politics will become a less disturbing factor in the auto workers movement. Mr. Bugas also disclosed that the Communist influence is a formidable factor in Ford's labor problems.

". . . We had sitting across from us the UAW negotiating committee at least one very able representative of the Communist Party," he said, "who would never make a decision in any of the extremely important issues without thoroughly consulting his principals in the Communist Party, and the prospect of a negotiation conducted in an atmosphere of reason almost disappeared." Mr. Bugas warned labor leaders against attempting to profit by using Communists for their own purposes. If the labor leader plays along with the Communist Party, he asserted, he is creating a Frankenstein monster that will sooner or later destroy him.

"The Communists may be useful to (the union leader) today, but they will be poison to him tomorrow and over a period of time they serve nobody's interest but their own. Labor leadership will have far greater freedom of action and far fewer headaches if it divorces itself from this unholy alliance."

MR. BUGAS sees in the present weakness of labor leadership a golden opportunity for American management to assert constructive leadership.

"The American working man must look to management, and increasingly does look to management, for the development of techniques to safeguard (the workers) physical and economic security and well-being," he declared.

Ford Motor Co., he said, spends more than $10 million a year on an industrial relations program which covers everything from grievance procedure to medical and safety measures. Ten years ago, he said, a program of these dimensions in the automobile industry was virtually unknown.

It is undoubtedly significant that this is the first time Ford has been openly critical of the UAW (CIO) except when contract negotiations have been stalemated. Some sources here are inclined to believe that the Bugas speech may well herald a new chapter in Ford labor relations. Other observers are more inclined to credit the Ford industrial relations department with a well-timed pronouncement on a subject that might never have been publicly aired if the present union factional fight in the UAW (CIO) had not burst out in its present fury.

The Ford pronouncement also strongly suggests that in the future the company may be counted on to play an increasingly aggressive role in its efforts to take the play away from union leaders. The latter, may, it is believed, have fumbled the ball by their present political excesses and failure to diagnose the will of the rank and file. Ford's recent success in carrying its case directly to its foremen would indicate that such a change in tactics may be worth trying at any rate.

HEAVYWEIGHT: *Believed to be the world's largest and most powerful tractor made by the Allis-Chalmers Mfg. Co. and weighing* 40,000 *lb is demonstrated in Milwaukee. The machine is being produced at the company's Springfield, Ill., plant.*

Ford Motor's Pension Proposal for Hourly Workers Is Defeated

Detroit

• • • **The Ford Motor Co.'s** proposal for a pension for hourly workers has been conclusively defeated (THE IRON AGE, Aug. 28, p. 87).

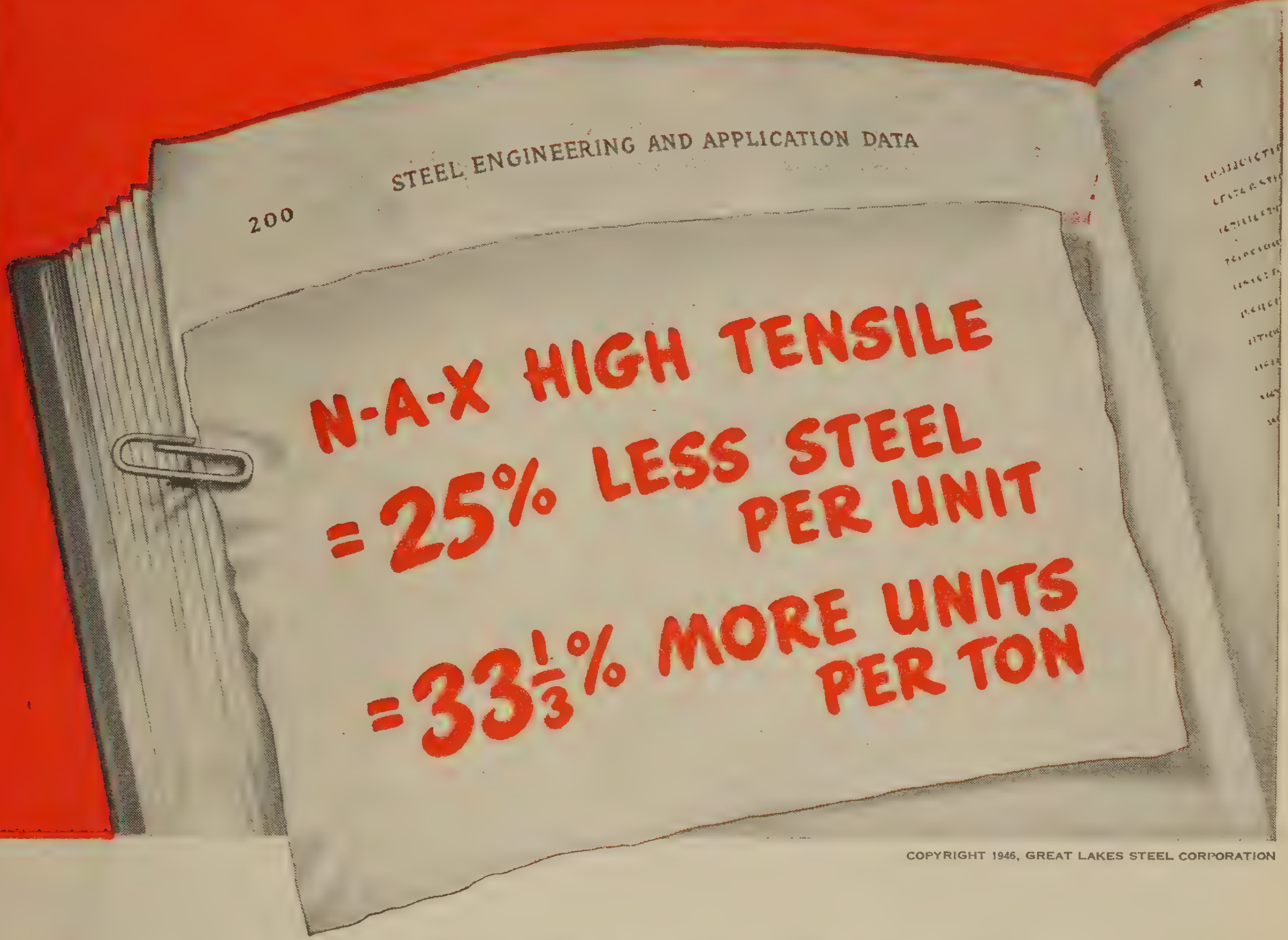
Early returns of voting at the huge Rouge plant showed the plan would be defeated by a margin of 3 to 1 or more. Defeat of the pension proposal has already been conceded by Richard T. Leonard, UAW-CIO vice-president who is generally regarded as "father of the pension plan."

A number of explanations have been offered to explain the defeat of the first pension proposal for hourly workers by a large automobile company. The current high cost of living, union politics and the fact that the average Ford worker apparently believes that "a bird in the hand is worth two in the bush" have been advanced to explain the results of the recent election.

Proposal No. 1 called for the pension plan, plus a 7¢ hourly wage boost, retroactive to May 31. Proposal No. 2 called for an 11½¢ wage increase, plus paid holidays.

Enemies of president Walter P. Reuther, UAW (CIO) have blamed him for minimizing the merits of the proposal. Meanwhile, Reuther is pressing General Motors for a pension plan.

THE NEW ARITHMETIC IN STEEL


STEEL ENGINEERING AND APPLICATION DATA
200
N-A-X HIGH TENSILE
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Today, many manufacturers are enjoying the important production advantages brought by N-A-X HIGH-TENSILE steel.

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Tomorrow, N-A-X HIGH-TENSILE will be available in ever greater quantities and to a wider field of users. Even though current production can't always keep pace with demand, our engineers will be glad to show you how helpfully N-A-X HIGH-TENSILE steel can fit into your future production picture.

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Washington . . .

EUGENE J. HARDY

• Government offers foreign protection to licensees of federally-owned patents . . . State Dept. completely stymies industry effort to obtain German and Austrian scientists . . . Joint Labor Committee becoming active . . . Hearings scheduled for December.

WASHINGTON—Within the next 30 days the Office of Technical Services, Dept. of Commerce, will begin releasing to industry lists of government-owned patents on which the department will apply for foreign patent rights for the protection of firms desiring to license these patents on a nonexclusive, royalty free basis.

The bulk of the government-owned patents are the direct result of the multibillion dollar Federal research effort. They cover a wide range of subjects and are now pouring into the Office of Technical Services from many agencies of government. OTS will act as a clearing house and will handle the dissemination of this information to industry.

THE IRON AGE is able to reveal that these patents will be of some interest to all branches of industry. For example, one group of patents covers such objects as ore concentration, handling molten magnesium, magnesite ore treatment, conditioning molten metal, and various types of machine tools. There are also reams of patents on radar and electronics equipment. Only patents pertaining to atomic energy and those in the interest of national security are excluded from the program.

Original announcement this summer to the effect that the government would begin to apply for foreign patents created quite a stir in the ranks of patent attorneys until the full intent of the administration became clear.

THE general theory behind the program was recently expounded with the utmost clarity by Under Secretary of Commerce William C. Foster when he stated: "The department has been directed by the President to acquire international patent protection for those American industries which have been granted licenses under government-owned patents. Through the Office of Technical Services, the department is carrying out these instructions. Upon the recommendations of the industries concerned, patents have been taken out abroad which will prevent unfair competition in the use of American research developments. At the present time, a canvass is being made of all government departments to determine what wartime research deserves such international protection."

This policy statement has done much to clear away the smoke screen of cries from the ranks of some patent attorneys to the effect that the government was socializing the international patent field.

Actually, as the program now stands the OTS will devote itself largely to securing information on patents which might be of interest to industry and will arrange to secure patent protection in the name of the United States.

In its broadest sense the program is an attempt to perfect rights in inventions already owned by the government which in turn will protect licenses of such patents. Such protection had always been assured by the government insofar as domestic rights were concerned, but foreign patent protection generally had been overlooked.

The expansion of government research which began during the early defense period and has continued until the present time brought about a realization that foreign patent protection was important in regard to thousands of wartime developments having commercial applications.

WHAT brought the situation to a head, culminating in the issuance of an executive order was a group of government patents on synthetic antimalarials held by the Office of Scientific Research and Development.

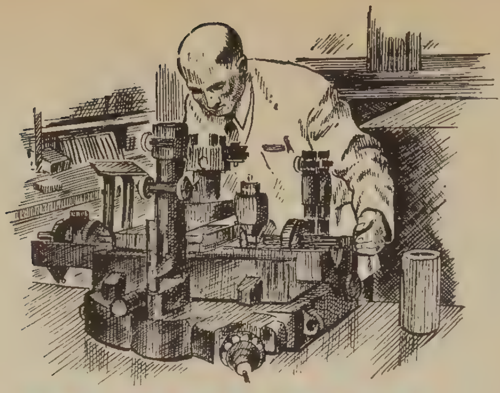
In this instance, the pharmaceutical industry was consulted as to whether foreign patent protection was desired, and, if so, in what countries. The industry answer was in the affirmative. The selection of countries and patent attorneys was determined by the industry and the work began. All costs were paid by the industry, since Commerce has neither the funds nor qualified patent attorneys. In fact, this is largely the case in all government agencies holding patents having commercial significance.

This pattern, worked out by John C. Green, director of the Technical Services, has been used successfully and will be followed in all cases where industries or individual firms desire foreign patent protection on government developments which they have secured licenses for or desire to do so in the future. The Commerce Dept. will act as agent for the government and as an intermediary between the agency owning the patent and the prospective licenses.

* * *

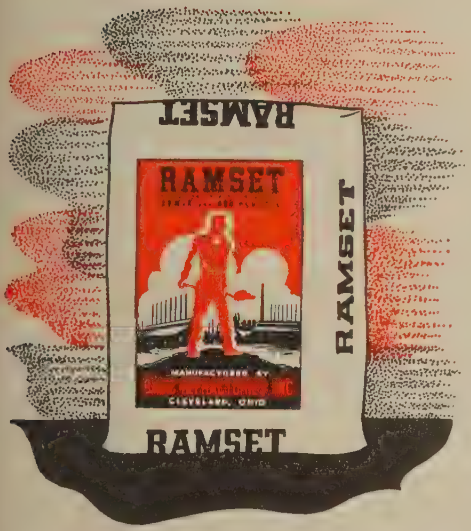
DEFENSE Secretary James V. Forrestal may soon be called upon to untangle the snarl which has entwined the program of importing German and Austrian scientists and technicians under contract to American industry.

While the Army has dropped its part of the procurement program effective Sept. 30, after having cleared about 25 individuals for industry, the military services are still in favor of permitting this type of personnel to enter the country. The Army will also continue to certify individuals requested by industry. The Justice



IT TAKES A STEEL YARDSTICK

to measure a Basic refractory



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Ramix and 695 Plastic**

THE chemical composition of a heat of steel does not fully determine the mechanical properties of a bar made from it. You must also know the physical structure of the steel for a sound appraisal.

Similarly, to judge the value of a basic refractory, you should measure the refractory with that same steel yardstick — chemical composition and physical structure.

The amount of magnesia by chemical analysis is only one basis for evaluating a basic refractory. But equally important as a measure of serviceability, is the structure, or mineral form in which the magnesia is present. Of the several mineral forms in which MgO can exist in a refractory, open hearth men are agreed that the most desirable is PERICLASE, or crystalline magnesia.

RAMSET contains approximately 67 percent of magnesia by chemical analysis, *all of which is present as the refractory mineral periclase.*

RAMSET is recommended for new hearth construction, for piping tapholes, and for both hot and cold repairs to open hearth and electric furnace hearths.

Basic Refractories Incorporated **845 HANNA BUILDING, CLEVELAND 15, OHIO**

Exclusive Agents in Canada: REFRACTORIES ENGINEERING AND SUPPLIES, LTD., Hamilton and Montreal and Commerce Depts. are also behind the program.

The latest fly in the ointment is the State Dept. It was believed that after the Army dropped the program, except for procurement of personnel required for its own research work, the State Dept. would permit continuation of the program by granting visas to personnel requested by industry.

But here again the State Dept's dilly-dallying tactics were brought to bear. While other departments of government are competely sold on the idea, State refuses to budge despite White House orders on two occasions to iron out the difficulties.

STATE'S delaying action has now taken the form of suggesting the creation of an intergovernmental advisory committee. This would be an utter waste of time since such a committee has been in existence for many months under the sponsorship of the Joint Intelligence Objectives Agency.

Reasons behind State's tactics are obscure. It has been suggested, however, that State is reluctant to permit entry into this country of Germans and Austrians who formerly held top technical posts under the Nazi regime because of the hue and cry that would be raised by various vocal groups, possessing considerable political power, who have been advocating the entry into the United States of large numbers of displaced persons now behind barbed wire in camps throughout occupied Europe.

As the situation now stands, the military services can still import these scientists and technicians if their work would be helpful to "national security." The Army will also continue to certify individuals requested by industry whose services would be in the "national interest," but in view of State Dept. stubbornness these people will still not be able to enter this country.

Personnel already in this country under Army or Navy contract will continue to be released to industry from time to time.

* * *

THE Joint Labor Committee created under the Labor-Management Relations Act of 1947 held its initial meeting this week. (Oct. 7 and 8). As the first step toward analyzing the practical operation of the new labor law, the committee is mapping plans for studies of about 25 representative industries.

THE BULL OF THE WOODS

BY J. R. WILLIAMS

ONE OF US WILL TAKE CARE OF IT, DAVE--YOU WAIT HERE NOW, DAVE--LISTEN!
NO--I'LL SEE HIM MYSELF! YOU WOULDN'T UNDERSTAND THIS!
THAT'S TH' CURSE OF TALKIN' TOO MUCH WHEN YOU'RE JUST ONE OF TH' BOYS! HE'D SAY, "BOYS, IF I EVER GET BIG, MY OFFICE WILL ALWAYS BE OPEN TO YOU!"
THERE'S A LOT OF 'EM LEFT YET AN' NOT ONE PAYS ANY ATTENTION TO TH' BULL'S FRONT MEN!
REPAIR ORDER CRANE NO 10112
J.R.WILLIAMS 10-10
"THE PROMISED LAND"
T M REG. U. S. PAT. OFF
COPR. 1947 BY NEA SERVICE, INC.

Studies of five companies already are under way by the committee. These firms are Pittsburgh Plate Glass Co., Botony Worsted Mills, Hormel Packing Co., B. F. Goodrich Rubber Co., and International Harvester Co. Commencement of other studies will be announced by the committee in the near future.

The committee plans to begin hearings early in December on matters developed in its investigations. Earlier, the committee had planned to study about a dozen firms with good labor relations records and a dozen with poor labor relations records. This idea has been dropped in favor of studying representative firms without primary regard for the individual company's past record. The Hormel Co., however, probably was selected because of the firm's long-standing guaranteed annual wage plan.

Almost all of the committee's 14 members are attending the first meeting this week. Senator Smith, R., N. J., and Rep. Lesinsky, D., Mich., have notified the committee that they will be unable to attend. Other members of the committee are Senators Ball, R., Minn., chairman; Taft, R., Ohio; Ives, R., N. Y.; Pepper, D., Fla.; Murray, D., Mont., and Ellender, D., La.; Representatives Hartley, R., N. J., vice-chairman; Hoffman, R., Mich.; Landis, R., Ind.; McCowen, R., Ohio; Barden, D., N. C.; and Kelly, D., Pa.

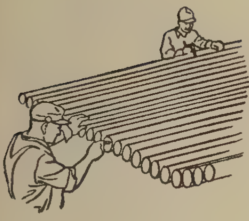
To Organize Reserve Units

Washington

• • • **New agreements** to organize reserve units under the Army's affiliated reserve program signed by industrial groups include the following: Cessna Aircraft, 64th Air Engineering Squadron; American Locomotive Co., 762nd Ry. Shop Battalion; Lima Locomotive Works, an Ordnance Tank Maintenance Company; Atlantic Coast Line Ry., the 703rd Ry. Grand Div., and Texas & New Orleans R.R. Co., 719th Ry. Operating Battalion.

Striking for a goal of at least 2500 reserve units within industry, as of Sept. 25 some 253 industrial firms had signed agreements to organize such military training units.

Steel tubes for Iron Horses



Today's high-efficiency locomotives demand a variety of steel tubes in their construction — stainless steel tubing, mechanical tubing, pressure tubes.

The locomotive of "The Cincinnatian", one of the crack trains of the B&O, is representative of today's finest streamlined "iron horses". Stainless steel tubes — used for trim and hand rails — are selected, not for beauty alone, but because they are impervious to stain or to corrosive attack by smoke, acids or weather.

Globe Steel Tubes Co., specializing in tubing manufacture, maintains continuous laboratory research to make steel tubes better — to produce tubes of such amazing uniformity and quality that they represent true "craftsmanship" in steel. If your needs in steel tubes involve problems — call upon the specialized experience and facilities of Globe.

Globe Steel Tubes Co. • Milwaukee 4, Wisconsin

Photo—courtesy of the Baltimore & Ohio Railroad.

Write for descriptive bulletins—GLOBE Seamless Stainless Steel Tubing — GLOWELD Welded Stainless Steel Tubing — and GLOBEIRON Tubing for all applications where a high purity ingot iron seamless tubing is required.

GLOBE

STEEL TUBES

West Coast . .

ROBERT T. REINHARDT

• California coal deposits once again get attention . . . Aeronautical authorities differ as to best type of power plant . . . Utah white elephant blast furnace may have new owner.

SAN FRANCISCO — Probably stimulated by the shortage of oil, natural gas and electric power, which some observers believe seriously threatens the continued industrial development of the West, the large deposits of low grade coal throughout California are being eyed as possible sources of energy.

According to the U. S. Geological Survey, California has a total workable coal area of approximately 500 sq miles extending along the Coast Range and spotted in the Sierra Nevada foothills which has an estimated 1 billion tons of coal and approximately 200 mines.

Admittedly, the California coal is of poor quality and is found in scattered small deposits, but it is optimistically believed by some industrialists that conversion of this material into liquid or gas in plants located at or near the coal deposits may be economically accomplished. The California State Chamber of Commerce points out that one German process is reported to have yielded 50 pct gasoline, 26 pct Diesel oil and 13 pct gas from similar material.

Joseph Pursglove, Jr., vice-president, research and development, Pittsburgh Consolidation Coal Co., is reported as stating that his organization could handle a very low grade coal in the production of gas and gasoline but that the economics would require further study. This company and Standard Oil Development Co. are engaged in joint research and development work in the utilization of low grade coal.

California—magazine of the Pacific, published by the State Chamber, reports that coal production was at one time an important industry in California with Contra Costa County leading the state in production. Originally discovered in 1855 by miners returning from the gold diggings, the Mount Diablo coal field in that county was opened in 1860 and terminated operations permanently in 1902. It is stated that the value of the coal produced in that period exceeded $20 million. The Black Diamond coal mine produced 1,570,481 tons of coal between 1861 and 1885, returning $1,370,000 on an investment of $324,000.

The discovery of hard coal in the Pacific Northwest is credited with having killed off the California coal mining industry and later on, when it appeared that the use of pulverized coal might make the reopening of the mines practicable, cheap natural gas was discovered in Kern County and once again further working of the mines was stymied.

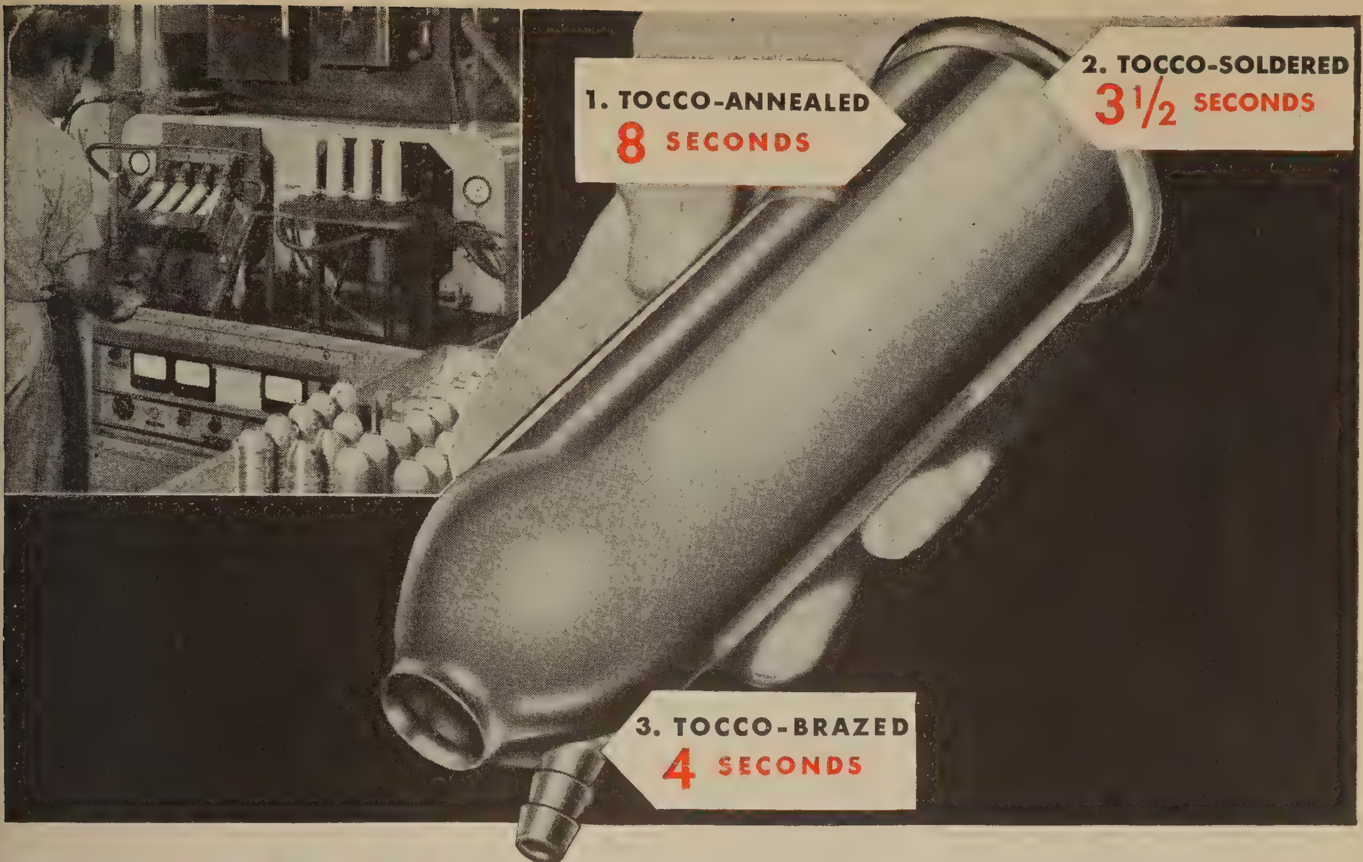
LOS ANGELES—Engineering opinions as to the relative advantages of gas turbines and of compounded reciprocating engines for aircraft powerplant use was the subject of much discussion at the SAE National Aeronautic meeting held here. Some engineers favored compounding as productive of high-order gains in power and fuel economy; others insisted that the 2 or 3-year job of making the compounded engine practical is wasteful of engineering manpower which better might be devoted to turbine development.

Compounding reciprocating engine and turbine, especially with the blowdown system, exhaust energy now wasted can be converted to useful work, such as creating additional crankshaft power or driving accessories. This point of view was presented by Erold F. Pierce and Harvey W. Welsh, of Wright Aeronautical Corp. They cited performance calculations to show that power production and fuel economy can be increased 15 to 21 pct, and significant improvements made in aircraft performance. They added that by combining blowdown and pressure recovery systems, energy now wasted could be used to increase power production by nearly 60 pct.

Opposing ideas, however, were presented by Dimitrius Gerdan and J. M. Wetzler, of Allison Div., General Motors Corp. They presented the results of a series of experiments which, revealing serious difficulties in handling exhaust temperatures of around 1950°F, indicated that the 2 or 3 years of development work required to bring the compounded engine to a practical stage might better be devoted to improving the turbo-propeller engine. They said that under certain operating conditions the power output of the compounded engine showed a gain of 36 pct and a reduction of 21 pct in fuel consumption, yet these gains were offset by the necessity for combatting exhaust temperatures which exceeded safe-operating limits and were too high for available turbines.

Development of smaller and lighter, more compact and useful, personal planes, and of larger aircraft which are quiet, was predicted by John W. Thorp, president, Thorp Aircraft Co. He suggested the two-cycle engine and the gas turbine as logical prospects for powerplants in the personal airplanes of the future. He said jet propulsion has not yet justified its use in small planes, but that both gas turbine and two-cycle engine promise much in the way of weight reduction essential to the lighter and more compact aircraft.

W. E. Burnham, of Beach Aircraft Corp., recommended that engineers seek to eliminate, alleviate, or reduce the intensity of airplane noises instead of merely following a detour into the field of insulation.



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SPEEDY HANDLING: Cool, clean, compact, TOCCO machine is located in production line handy to related operations. Minimizes haulage . . . for *lower costs.*

SPEEDY PRODUCTION. In addition, TOCCO eliminates scale formation and distortion, minimizing cleaning and avoiding straightening . . . for *lower costs.*

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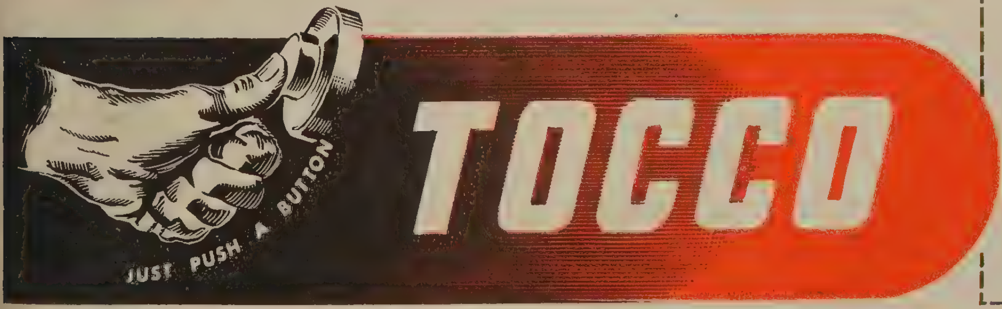

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Solution of the aircraft noise problem is not simple, he added, yet it can be solved, will be solved, and should be solved before laws are enacted to establish maximum noise level limits. Slow-turning propellers, perhaps of the multiple-blade and controllable types, may eliminate some of the more intensive noises, explained Mr. Burnham, while renewal of development work on mufflers would be an additional contribution to silence in the skies.

SALT LAKE CITY—Hunger of the steel industry for pig iron is emphasized by the bid of Portsmouth Steel Co. of Portsmouth, Ohio, for the transplanted surplus blast furnace at Ironton, Utah and 500 beehive coke ovens in Carbon County. A spokesman for the bidder reported that it is the present intention of the company to put the furnace into operation and ship pig iron to the Ohio mill if WAA accepts the offer. He conceded, however, that economic feasibility of the plan is still a question which must be given more study before a definite conclusion can be reached.

The Portsmouth bid is $250,000 for the furnace and $50,000 for the beehive coke ovens. The government investment in the furnace, which was moved from Joliet, Ill. to supply pig iron to West Coast users while the Geneva plant was abuilding, is around $9 million and the coke ovens cost more than $3 million. WAA will presumably weigh the offer for the blast furnace against scrap value, as only one bid was received for that facility. But the Utah Fuel Co. submitted an offer to lease the beehive coke ovens for 6 months with an option to buy for $150,000. The lease offer was 35¢ per ton royalty on coke produced with a guaranteed minimum of $4500 for the 6 months.

Portsmouth Steel Co. was organized last year with Cyrus Eaton, Cleveland financier, as chairman of the board. It purchased a plant of the Wheeling Steel Corp. and sells about 20 pct of its output of semifinished steel to the Kaiser-Frazer Corp. which is a minority stockholder.

D. D. Cooper, assistant to the president, said the firm is interested in the Ironton furnace both as a temporary and as a permanent source of supply of pig iron.

TWO other major war surplus plants in this area are still on the auction block with no takers in the immediate offing. One is the Kalunite, Inc. alumina plant in Salt Lake City and the other is the $30 million small arms ammunition plant which was operated during the war by Remington. WAA recently rejected the high bid of J. R. Simplot Co., Boise, Idaho, for the Kalunite plant on the grounds that the offer of $510,000 was too far below the estimated value of the property. Simplot proposed to use the plant, which cost $4,533,000, for production of phosphate fertilizer.

Efforts are being made to dispose of the ammunition plant on a piecemeal basis. Thus far cautious nibbles have been received from a wool processing firm, a copper processor and some machinery manufacturing companies.

TWO IN ONE: *The Paul M. Wiener Foundry, Muskegon, Mich., built their new facilities around the old foundry and production continued unhampered during construction. The walls and roof of the old building were removed after the new walls and roof were completed. Much of the new equipment has now been installed and all construction will be finished within the next 60 days.*

Utah's Attorney General, Grover A. Giles, has ruled that U. S. Steel Corp. is liable for the 2 pct state use tax on approximately $15 million in connection with the purchase of the Geneva steel plant from the government. The attorney general arrived at the amount by examining the deeds and segregating personal from real property. The steel company has contended that the sale represented a single transfer of a "going concern" and therefore is not subject to the state sales or use tax. The state supreme court may be called upon to give the final answer.

PORTLAND—Encouraging to scrap starved northwestern steel producers are the announcements of the organization of two new companies to go into the business of shipbreaking.

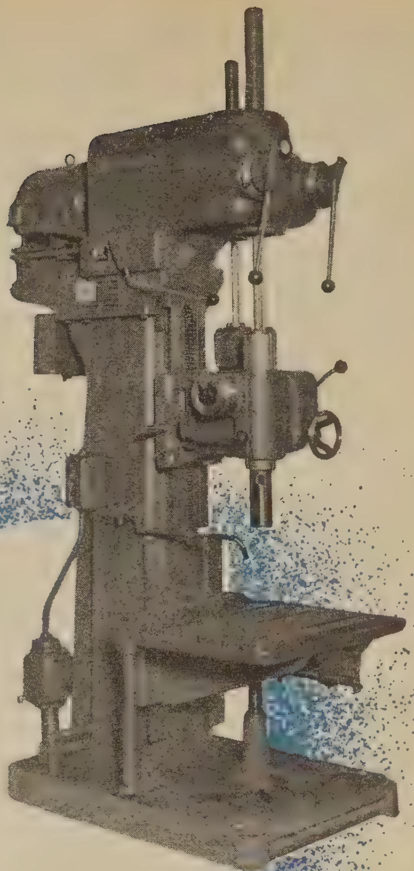
Barde Steel Co., Alaska Junk Co., and Page & Page, have formed Marine Railway, Inc. and purchased the marine railway and other equipment owned by the government at the former Commercial Iron Works for $26,200. These facilities originally cost the government approximately $2¾ million.

The newly formed company has bid on 15 naval vessels ranging in size from 600 to 3000 tons and the management estimates that approximately 10 vessels a month will be dismantled and that approximately 500 men will be employed.

Consolidated Builders, Inc., controlled by the same contractors responsible for the construction of Coulee Dam and who operated the Oregon Shipbuilding Corp. under the management of Henry J. Kaiser, has taken over the facilities formerly operated by Kaiser Co., Inc. on Swan Island for the purpose of shipbreaking.

Albert Bauer, who has been general manager of the ship repair activities of the Kaiser Co., will continue as manager of the scrapping operation.

Consolidated Builders will use the lower half of the outfitting dock, finger pier and other buildings adjacent to these facilities and the company has a lease arrangement with the Navy for use of its large dry dock where it will engage in general repair work. Sixteen LST's have been purchased thus far for scrapping here. Operations are expected to begin this month with about 150 employees.



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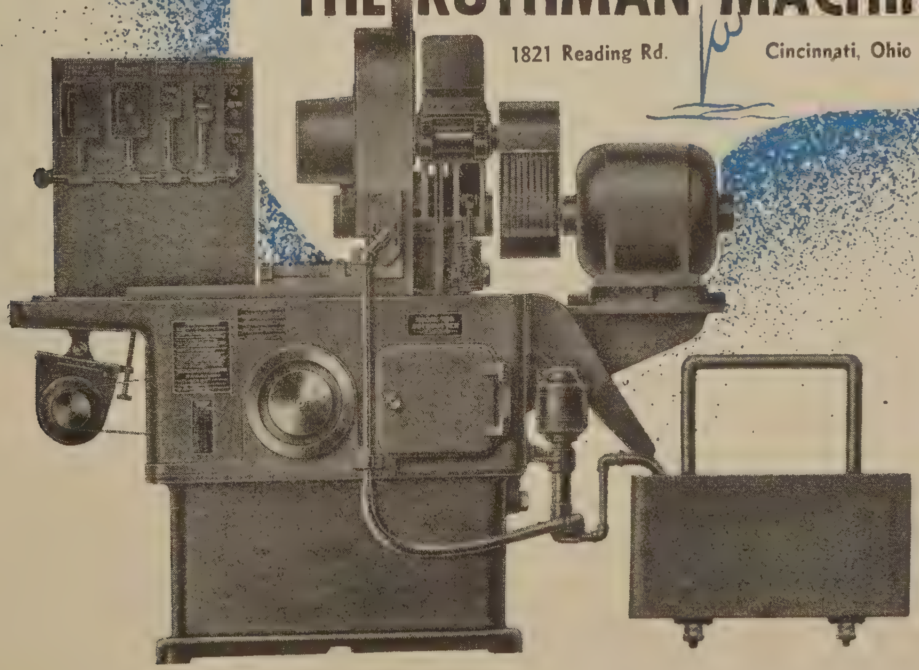

Photos Courtesy:

Bryant Machinery and Engineering Co.
Chicago, Illinois

American Chain & Cable Co.
Bridgeport, Conn.

PERSONALS

* * *

• **John H. Keating** has been elected vice-president in charge of manufacturing of the Monarch Aluminum Mfg. Co., Cleveland. Mr. Keating joined Monarch in 1929 as foreman of the polishing department. Since then, he has been responsible for a continuing plant-wide program. **Edward C. Bloomberg** has been elected to the office of treasurer; **S. C. Sawyer,** secretary; and **Robert I. Kopper,** assistant secretary.

• **Stanley M. Rumbough, Jr.,** director and secretary of the White Metal Mfg. Co., Hoboken, N. J., has been appointed director of sales. Until recently Mr. Rumbough was vice-president in charge of sales and traffic of Willis Air Service. He remains a director of that company.

• **William R. Willard** has been named to the post of director of organization planning for Columbia Steel Co., with headquarters at San Francisco. Mr. Willard has been associated with Columbia for 10 years in the market research department and as administrative staff assistant in the office of the president.

• **Jack L. Ashby** has been appointed vice-president and assistant general manager of the Iron & Steel Div. of Kaiser Co., Inc., Oakland, Calif., and **C. F. Borden** has been named general sales manager to succeed Mr. Ashby who has held that position since formation of the company 5 years ago. Mr. Borden had previously been assistant general sales manager.

• **Edward J. Hanley,** vice-president in charge of finances, secretary and treasurer of Allegheny Ludlum Steel Corp., Pittsburgh, has been elected a director of the company. **Stanley A. McCaskey,** who previously was assistant secretary, has been elected secretary to relieve Mr. Hanley of that duty.

• **W. J. McArdle** has been appointed vice-president and sales manager of the Rigid-Tex Corp. of Buffalo. Mr. McArdle was formerly sales manager for the company.

• **David B. Hill** has been appointed district field engineer in the Atlanta office of Chain Belt Co., Milwaukee. Previously he had been an application engineer in the company's conveyer division. He joined the organization in 1937.

• **William J. Gazey** has been appointed executive vice-president and general manager of the Massillon, Ohio, Aluminum Co., a wholly-owned subsidiary of Ekco Products Co. Mr. Gazey, who has been general production manager for Ekco, also becomes executive vice-president and general manager of Ekco's Byesville, Ohio plant.

• **Eric V. Murray** has been appointed assistant to the vice-president and general sales manager, Edward Geary, of Atlas Steels Ltd., Welland, Canada. Prior to joining the Atlas organization in 1935, Mr. Murray was associated with the Dominion Steel & Coal Corp. as assistant mill superintendent. With Atlas Steels Ltd., Mr. Murray headed the production planning department and lately has been connected with the domestic sales division.

• **C. James Gardner,** formerly chief of the machinery, metals and chemicals section, Export Div., Dept. of Trade & Commerce, Ottawa, has been appointed Toronto branch manager for the Jessop Steel Co., Washington, Pa.

• **Norman B. Johnson** has been appointed to the newly-created post of assistant executive vice-president of Pullman-Standard Car Mfg. Co., Chicago. Mr. Johnson acted as chief engineer of Pullman-Standard until 1938, when he was made manager of freight car plants of the company, which position he held until his present appointment.

• **H. M. Shank,** Boston branch manager of the service-sales division of the Timken Roller Bearing Co., has been appointed Detroit branch manager to succeed **J. D. Jesseph,** who has resigned. **Frank M. Barry,** formerly a field representative in the New York office, has been made manager of the Boston branch.

• **C. W. Ballard,** assistant manager of Hercules Powder Co.'s explosives department district office in Pittsburgh, has been appointed manager.

• **J. L. Hamilton, Jr.,** formerly assistant general manager of sales of Granite City Steel Co., Granite City, Ill., has been appointed sales manager. **Erwin Niedringhaus,** formerly manager of tinplate sales, has been appointed assistant sales manager.

• **Richard M. Barnes** has been appointed northeastern sales and service manager for Dravo Corp.'s Counterflo heaters and crane cab coolers. Mr. Barnes' headquarters will be in Boston. He previously was assistant sales manager in the heating section of Dravo Corp.'s machinery division in Pittsburgh.

• **S. B. Murphy** has been appointed field engineer in the Pittsburgh district for Nelson Stud Welding Corp. and its affiliated companies. Mr. Murphy has been associated with the Eutectic Welding Alloys Corp. and spent most of the war period with Dravo Shipbuilding Corp.

• **Herbert W. Smith** has been appointed direct European representative of the National Acme Co., with headquarters at Birmingham, England. For the past 13 years he has specialized in multiple spindle engineering for National Acme representatives.

• **R. R. Compton** has been appointed the new central regional manager, and **E. R. Limb** the new southern regional manager, Nash Motors Div., Nash-Kelvinator Corp., Detroit. New zone managers are **L. B. Hakes,** Chicago; **R. L. Alexander,** Dallas, and **R. A. Kolb,** Memphis. Mr. Compton, now in his seventh year with Nash, has been transferred from the southern region. He replaces **G. E. Walrath,** the new western regional manager. Mr. Limb, who replaces Mr. Compton in the southern region, was appointed Dallas zone manager in May of this year after serving as manager of the Kansas City zone. Mr. Hakes, new Chicago zone manager, replaces **R. M. Kelly,** who will operate a Nash dealership in Waukegan, Ill. Previously Mr. Hakes was zone manager in Cincinnati. Mr. Alexander, the new Dallas zone manager, was transferred from the Memphis zone, where he was named manager in 1946. Mr. Kolb, the new zone manager in Memphis, has been promoted from assistant zone manager.

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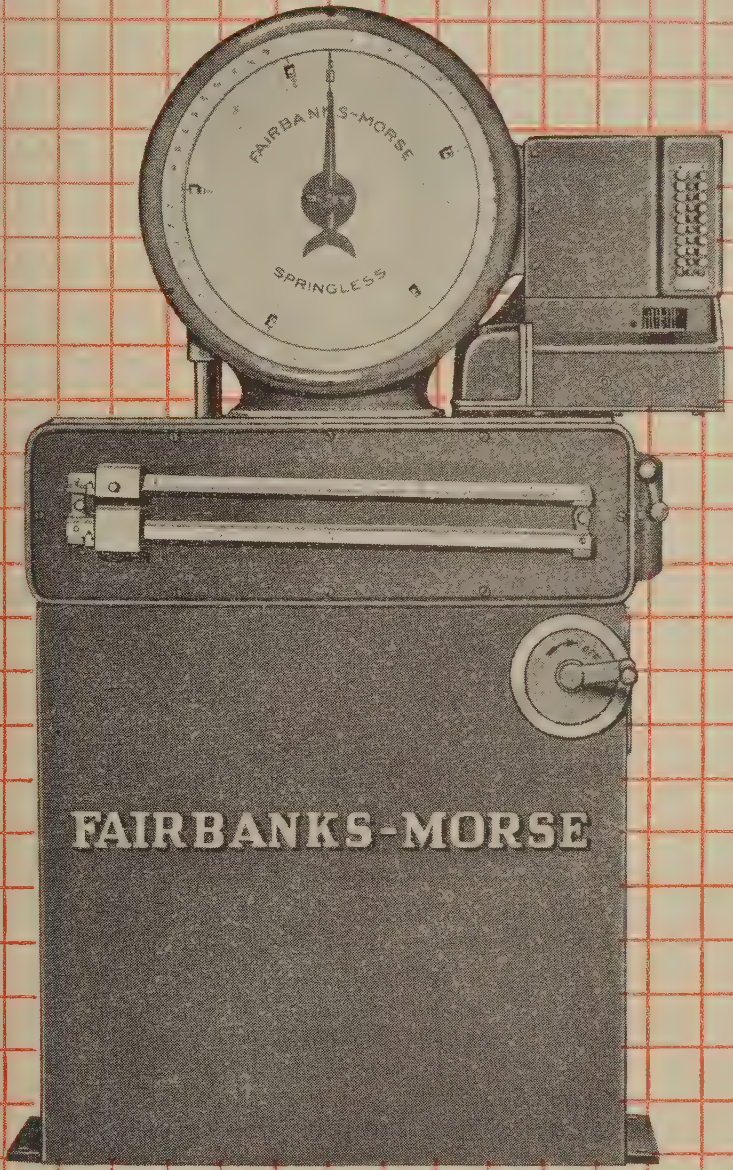

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• **Earle S. MacPherson,** formerly chief engineer of the light car division of General Motors Corp., has been appointed to a major executive engineering post with the Ford Motor Co., Dearborn, Mich.

• **A. W. Peterson,** formerly Kansas City district sales manager for Hotpoint, Inc., has been made western manager of utility sales, and **A. H. Jaeger** has been appointed eastern manager of utility sales.

• **H. R. Russell** has been appointed general sales manager of Tinnerman Products, Inc., Cleveland. Mr. Russell comes to the Tinnerman organization from Rochester, where he served in the capacity of vice-president and general sales manager of the Commercial Controls Corp. since 1941.

• **B. H. Johns,** for the past 7 years manager of the St. Louis branch of Independent Pneumatic Tool Co., Chicago, has been appointed manager of the company's mining and contractors tool sales division, with headquarters at Chicago. Mr. Johns has been a member of the Thor sales organization for 21 years. **W. B. Smith,** former manager of the Houston branch will succeed Mr. Johns as manager of the St. Louis branch, and **R. F. Caslin,** former Thor electric tool service engineer in the Houston territory, has been appointed to succeed Mr. Smith as Houston manager.

• **William H. Ross** has been appointed New England representative for the Gensco Tool Div. of General Steel Warehouse Co., Inc., Chicago. Mr. Ross formerly was with Biltmore Products, Inc. He succeeds **Eric Kihlstrom** as Gensco representative in the New England territory. Mr. Kihlstrom will supervise sales from the company's home office.

• **Harry La Potterie** has retired as manager of the Detroit sales office of Lamson & Sessions Co. **Victor Samson** has been appointed to succeed him. Mr. Samson has been associated with Lamson & Sessions since 1923, and has spent most of that time as a representative of the company in the Detroit area.

ELMER E. ISGREN, vice-president in charge of production, R. G. LeTourneau, Inc.

• **Elmer E. Isgren,** pioneer member of R. G. LeTourneau, Inc., Peoria, Ill., has been appointed vice-president in charge of production. Mr. Isgren is also a director of the LeTourneau Corp. and, for the past year, has been manager of the Longview, Tex. plant.

• **M. D. V. Millard** has been appointed assistant manager of sales, Detroit district sales office, American Steel & Wire Co., U. S. Steel Corp. subsidiary. Mr. Millard has been associated with American Steel & Wire since 1934 when he began as a technical apprentice in the wire rope division at New Haven, Conn. He subsequently served in the sales department in Cleveland and Washington, before joining the Navy in World War II. Since November 1945, Mr. Millard has been located in the New York sales office as a salesman in the manufacturers products division. **C. F. Wiley** has been promoted to assistant manager, Chicago district sales office, American Steel & Wire Co., in which position he will share in the responsibility of all phases of the Wire company's sales in the Chicago area. **Bruce D. Bennett** has been named manager of the electrical, wire rope and construction materials division in Chicago, succeeding Mr. Wiley. Mr. Wiley's entire career has been with the Wire company in Chicago, having started as a correspondent in 1908. He has been manager of the electrical, wire rope and construction materials division since 1931. Mr. Bennett began working for the Wire company in 1935, as a student apprentice in the physical laboratory at South Works, subsequently working at the New Haven, Worcester and Cuyahoga Works before becoming a price clerk in the Cleveland district sales office in 1937. He has been manager of sales at Wilkes-Barre, Pa., since 1943.

• **E. L. Klopfer** has become associated with Morrison Metalweld Process, Inc., of Buffalo, to research its track appliance and field operations. **M. L. Morrison** has been appointed assistant to the vice-president of the company. He was formerly in the estimating and engineering department.

• **John C. Cheney,** former Louisville branch manager for Pitney-Bowes, Inc., has been appointed manager of the Milwaukee sales and service division to succeed **C. S. Berger,** who has been transferred to Philadelphia.

• **Dr. Reid G. Fordyce** has been appointed sales development manager and **Edmund S. Childs,** assistant manager of the sales development department, Monsanto Chemical Co.'s plastics division, Springfield, Mass. Dr. Fordyce joined Monsanto's central research department as a research chemist in 1939 and in 1945 was appointed group leader for polymer research. Mr. Childs joined the plastics division sales department in 1940. He was recently sales representative in Cincinnati. **Robert L. Rickenbacher** has been appointed senior sales representative for Monsanto Chemical Co.'s plastics division on the Pacific Coast. Mr. Rickenbacher replaces **R. J. Lambert,** who recently resigned. He will be headquartered at Monsanto's Los Angeles office. **John W. Stewart** has been appointed to the sales and development staff of the textile chemicals department of Monsanto. He will make his headquarters at the company's new offices in New York. Mr. Stewart was formerly New England representative of the Aqua-Sec Corp. and for 10 years was a technical representative for General Dyestuffs Corp.

- **H. E. Johnson** has been appointed Chicago district manager of Alloy Steel Products Co., Linden, N. J. His headquarters will be at the new sales office at Chicago. Mr. Johnson was previously with Edward Valves, Inc. as sales engineer.

- **Frank W. Lynch** has been appointed manager of the Detroit Div. of Reynolds Metals Co.

- **Charles T. Button** has been appointed general sales manager of the Howell Electric Motors Co., Howell, Mich. Mr. Button had formerly been with the Master Electric Co., Dayton, as sales manager of the electrical controls division and assisted with the development and sales of motor control equipment.

- **Edwin R. Jung** has been appointed manager of industrial sales for Clark Controller Co., Cleveland. Mr. Jung has spent many of his 17 years with the Clark Co. as Atlantic Coast regional manager.

- **Wade Stevenson** and **C. Edgar Schabacker, Jr.** have been elected to the board of directors of Frontier Industries, Inc., Buffalo. Mr. Stevenson is president of the Eastman Machine Co. and Mr. Schabacker is a director of the Foster-McClellan Co.

- **A. W. Ostberg,** formerly purchasing agent of Stephens-Adamson Mfg. Co., Aurora, Ill., has been promoted to assistant manager of the merchandise division. **E. K. Race** has been named as the new purchasing agent.

- **Stuart O. Fiedler** has been appointed manager of research of the Industrial Rayon Corp., Cleveland. Mr. Fiedler, formerly manager of the South Chicago branch of the Bjorksten Research Laboratories, will remain a director of the latter company.

- **Thomas W. Krueger** has been appointed advertising manager of Duff-Norton Mfg. Co., Pittsburgh. For the past 10 years, Mr. Krueger has been with the advertising department of Jones & Laughlin Steel Corp., with the exception of a period of 3 years when he served in the Army.

PAUL J. MOORE, director of sales and engineering, Crocker-Wheeler Electric Mfg. Co.

- **Paul J. Moore** has been appointed to the newly-created position of director of sales and engineering of the Crocker-Wheeler Electric Mfg. Co. of Ampere, N. J., a division of Joshua Hendy Corp. Mr. Moore was formerly connected with the motor engineering and sales departments of General Electric Co. He was subsequently sales manager of Imperial Electric Co., manager of sales and engineering of Star Electric Motor Co., and manager of the commercial department of Watson-Flagg Machine Co.

- **Frank W. Klatt** has been elected president of W. W. Sly Mfg. Co., Cleveland. Mr. Klatt served as general manager of the company from 1921 to 1927 and then spent 12 years in India as managing director of General Motors Corp. there. Upon his return to Cleveland in 1939 he rejoined W. W. Sly Co., serving as general manager until his election to the presidency. He succeeds the late S. C. Vessy.

- **Harry S. Grande,** former vice-president of the Seattle National Bank, has been named to the board of directors of Western Metalcraft, Inc. which has a fabricating plant in Olympia, Wash.

- **Carl W. Jordan** has been appointed to the position of vice-president of the Horton Mfg. Co., Fort Wayne, Ind.

- **Dr. Hugh H. Mosher** has been appointed director of organic research for Quaker Chemical Products Corp., Conshohocken, Pa. Dr. Mosher comes to Quaker after 14 years with the Onyx Oil & Chemical Co. where he was vice-president in charge of textile research and development.

- **Donald A. Keating** has been placed in charge of the technical department for the midwestern division of Turco Products, Inc., Los Angeles. Operating from headquarters of the midwestern division in Chicago, he will direct technical activities of the organization in the 12 midwestern states. Mr. Keating joined the technical staff of Turco in Los Angeles in June of 1946. Since that time he has served as technical service engineer. **James D. Schwedler** has been placed in charge of the technical activities for the company's southwestern division, with headquarters in Houston. Mr. Schwedler is also to direct all technical service activities of the organization in the southwestern states. He comes to his new position after a period of extensive training and service in the laboratory of the company's district office in Chicago.

- **James W. Davis** has been appointed manager of sales of Lapham-Hickey Co., Chicago. Prior to his joining Lapham-Hickey in 1944 as manager of tubular sales, he was associated with the Pittsburgh Steel Co., for a period of 10 years, and from 1942 to 1944 he served on the War Production Board as chief of the Carbon Steel Tubing Div.

- **Grenville R. Holden,** vice-president of Sylvania Electric Products Inc., has been elected to the board of directors of Electronic Tubes Ltd. of London, a British radio tube manufacturing affiliate of Sylvania Electric. In addition to these duties he will continue to carry on his general corporate responsibilities at Sylvania's executive headquarters in New York. Named a vice-president of Sylvania in April of this year, Mr. Holden joined the company in 1943 as secretary to the management committee. In 1946 he was made assistant to the president.

• **J. G. Bartley** has been appointed southeastern district manager for Ohmer Corp., subsidiary of Rockwell Mfg. Co. He succeeds **W. H. Carrington,** who is being transferred to the newly-established central district. Mr. Bartley, for many years, has been associated with the cash register industry as salesman, sales agent and branch manager. He will establish his headquarters in Orlando, Fla. Mr. Carrington, who for the past several years has been southeastern district manager for Ohmer Corp., will be located in Dayton.

• **Robert W. Hipkiss** and **Edna Meyne Lee** have been named assistant treasurers of the Barcalo Mfg. Co., Buffalo. Mr. Hipkiss has been assistant manager of tool sales since returning from the Army in 1946. Mrs. Lee formerly was secretary and a director of the Sponge Aire Seat Co., which was merged with Chandler Industries in 1945 and now is a division of Barcalo.

• **Joseph G. Hughes** has been appointed manager of appliance sales for the Yale & Towne Mfg. Co. in upstate New York and Connecticut. He formerly was with the General Foods Corp. in New York.

• **F. W. Kateley** has been promoted to chief engineer and **E. G. Mathauer** to assistant chief engineer of the ACF-Brill Motors Co., Philadelphia. All product engineering and design and development engineering have been consolidated into one department under these men. Mr. Kateley, formerly chief engineer of the product engineering department, has been associated with the ACF-Brill organization since 1926, first as chassis engineer and subsequently as motor coach engineer. Mr. Mathauer became associated with the company in 1924 as a designer. Later he became body engineer and then new development engineer. During the past year Mr. Mathauer has been the resident ACF-Brill engineer at the Consolidated Vultee plant in Nashville. **Walter I. Rogers, Jr.** has been advanced to resident ACF-Brill engineer at the Nashville plant.

• **Harry G. Campbell** has been appointed sales manager of the DieseLight Div. of the Buda Co., Harvey, Ill. Mr. Campbell's past experience includes 15 years with the Westinghouse Electric & Mfg. Co. at Pittsburgh in the sale and manufacture of generator sets and 5 years as a manufacturer's representative handling the sale of engine generator sets in the states of Illinois, Kentucky, and Arkansas.

• **H. Barden Allison** has been appointed sales manager of the Gilmer Div. of U. S. Rubber Co. in Philadelphia. Mr. Allison's former position was district sales manager of mechanical goods in the Cincinnati district. He also has held positions in Cleveland and Indianapolis. He started his rubber career 29 years ago as an order clerk in the company's Philadelphia office. Mr. Allison will be succeeded at Cincinnati by **Ralph W. Stambaugh,** a salesman in that district. **Purdy Miller,** district sales manager in Buffalo, has been appointed district sales manager in Indianapolis. **N. W. Swenson** succeeds Mr. Miller at Buffalo. **Paul S. Bigby,** assistant district sales manager at Detroit, has been named district sales manager at Milwaukee.

• **John F. Howe,** formerly associated with the paint division of E. I. du Pont de Nemours Co. for the past 24 years, has joined Eastern States Paint & Varnish Co., Philadelphia, as vice-president.

• **L. R. Keltner,** superintendent of the Akron, Ohio tire division of the B. F. Goodrich Co., has been named manager of the Los Angeles plant. He succeeds **P. W. Perdriau,** who assumed Mr. Keltner's former post in Akron. Mr. Keltner has been with the company since 1926. Superintendent of the Akron tire division since 1945, he had previously been assistant technical superintendent of the division and handled many special technical assignments during the war. Mr. Perdriau has been with the company since 1934, starting as a chemist. He was in DeIcer production during the war years and had been manager of the California plant since 1945.

• **W. W. Hollo** has been appointed General Electric Co. representative for wire and cable in the New York district. Mr. Hollo joined the company in 1935 and served successively as stock records and back order clerk, order service supervisor and assistant to the sales manager of the Bridgeport, Conn. wire and cable section.

• **John R. Reeves,** general superintendent of the Republic Light, Heat & Power Co., Buffalo, has been elected vice-president of the company; **Donald A. Hamilton** has been named treasurer, and **Donald P. Spencer** has become secretary. They succeed James A. Richie, who held the three posts when he died recently.

• **M. E. Vaughn** has been made director of purchases at the Gardner, Mass. plant of the Florence Stove Co.

• **Nelson J. Leonard** has been placed in charge of the Elwell-Parker trucks, tractors and cranes account for the Colby Steel & Engineering Co., Seattle.

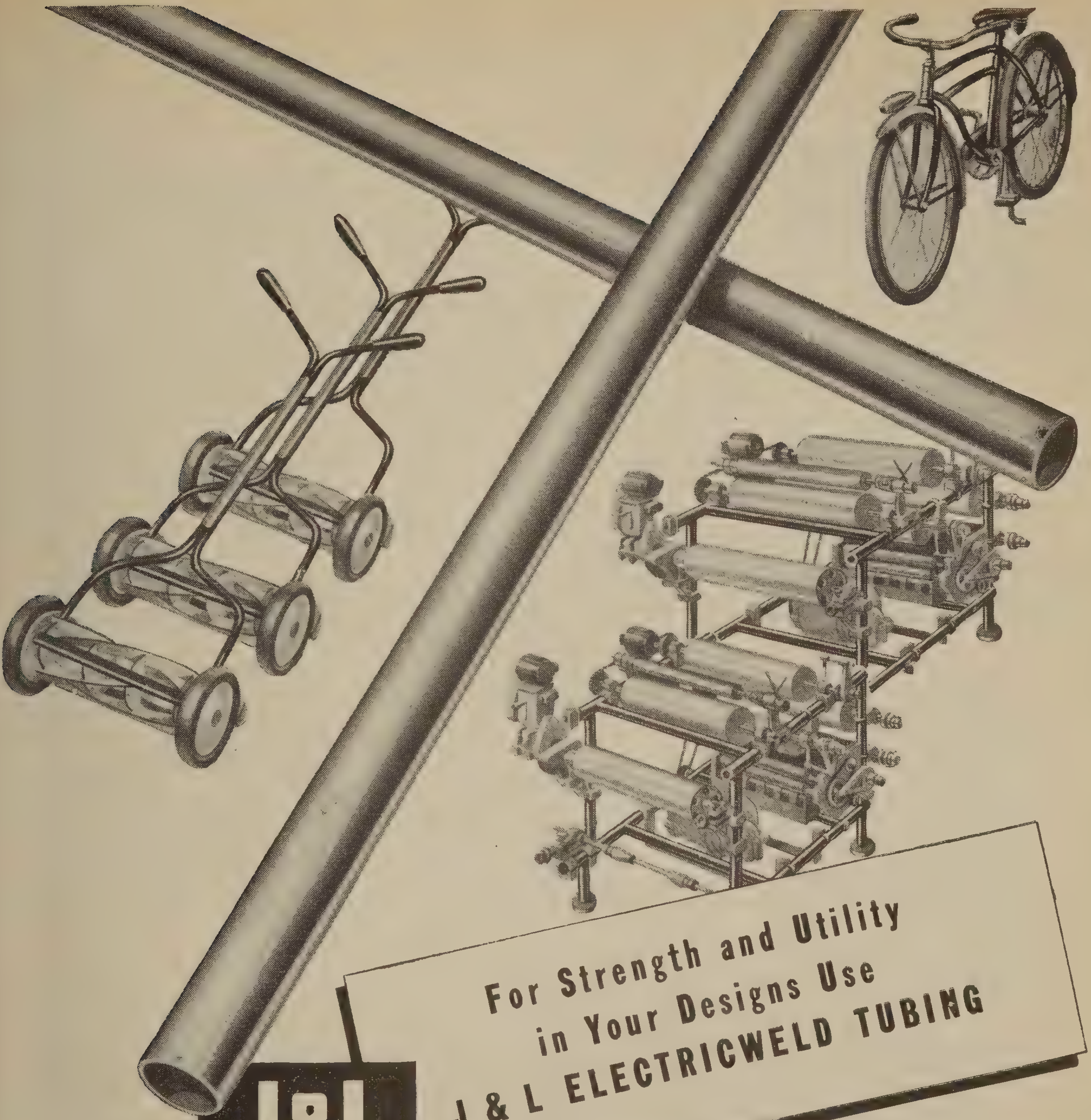
OBITUARY...

• **Donald D. Whitcomb,** 51, farm products marketing agent of the Tennessee Coal, Iron & R.R. Co., Birmingham, died Sept. 8. Mr. Whitcomb had been associated with the company for 10 years.

• **Frederick C. Hawkins,** 68, operating engineer for the Linde Air Products Co. in Buffalo, died Sept. 21.

• **Price M. Davis,** 77, president and general manager of Shadbolt & Boyd in Milwaukee, died Sept. 21. He also was head of the Northern Hardware & Supply Co., Menominee, Mich.

• **Lawrence G. Pritz,** 59, president and founder of the Ohio Ferro Alloys Corp., Canton, Ohio, died Sept. 12. He had been connected with the Illinois Steel Corp., Timken Roller Bearing Co. and United Steel Co. before establishing the Ohio Ferro Alloys Corp.



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European Letter . . .

• Vishinsky's speech full of defiance but fails to reveal real motives of Russian policy . . . Russia seen remaining in UN.

LONDON—The Soviet Union is still a member of the United Nations, although Mr. Vishinsky has treated the General Assembly to a tirade which sounded in parts like a defiant farewell. Indeed, on the main issues now before it Mr. Vishinsky need hardly speak again, for that speech had everything: The main heads of indictment against the West, all the grievances, all the suspicions, everything except what everyone wants to know—the real motives of Russian policy.

It was utterly unconstructive, blatantly uncooperative; its self-righteousness was frightening. It offered for the rest of the Assembly's session no prospect save that of bitter wrangling over problems which demand action, but which can be dealt with only in defiance of a Soviet delegation voting in a perpetual minority.

Nothing could seem at first sight more futile, but it is a vital Soviet interest to remain in the United Nations, to cripple the Security Council by delaying tactics if it tries to act against Soviet or satellite policies, to widen its jurisdiction if that will embarrass the Americans or the British, to build up its prestige as a rostrum from which a nervous and irritable world can be addressed in ideological terms.

At Lake Success and Flushing Meadows a picture can be built up of a world hostile to Russia which is transmitted, with every appearance of truth and completeness, to the Russian people and to Communist parties all over the world.

In this political strategy the veto is of course the key weapon; and it is at the use made of it by Mr. Gromyko on twenty different occasions that Mr. Marshall's present operation in the "cold war" is aimed. That is why Mr. Vishinsky's counterattack was so violent, and why, in a speech lasting 1¼ hr, less than 4 min were given to the American proposal that the Assembly should form a standing security committee to consider disputes and dangerous situations.

YET this American proposal was something more than a dramatic and unexpected move in the diplomatic attack that began last March with the proclamation of the Truman Doctrine. It expressed very fairly the sense of impatience and frustration among the vast majority of the UN delegations caused by the way in which their own recommendations and those of a majority of the Security Council had been flouted—not only in the case of the Greek frontier situation, but also in the cases of the atomic energy commission, of the general disarmament resolution of last December, of the recent applications for membership and of the discussions on UN international force.

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They have seen no progress in any direction, nothing but success for systematic obstruction. The equality of sovereignty promised them in the Charter—on occasions eloquently defended by Soviet spokesmen—has turned out to be no more than equality of impotence. The fact that the Soviet government can count for certain on no more than five votes against 45 or more in a major issue and yet get its own way seems to them a travesty of UN's function. And so it is.

Are the members of the Assembly then to cross their fingers and hope that time will bring them a solution and their rights? Or are they to take sides in the American-Russian duel and try to make the international machinery work before it breaks down at the first major test?

THE answer is obvious and, whatever may be thought of the timing and manner of Mr. Marshall's lead to the Assembly, he was right to give a lead. That he was acting as an American statesman first and on behalf of the General Assembly second need not affect judgment on that question, because in many important respects the interest of UN and those of the United States are identical.

All the main benefits that the organization was intended to provide would further the permanent purposes of American policy: Security through international forces, arbitration in disputes, international cooperation in commercial policies, social stability and prosperity. And it is because of Russia's manifest unwillingness to help in assuring such benefits to postwar Europe that the Americans began playing — with reluctance and foreboding—the role of a European Power.

Unfortunately, it looks as if the judgment of Mr. Molotov and his assistants is permanently clouded by a obsession: By the dogma that Western Europe is doomed to decrepitude within their lifetime by the diseases of the capitalist system, that its banker and patron, America, is doomed to a slump, and that both victims will grow desperate and dangerous as they feel their symptoms growing on them.

Whence it follows that it is good policy to aggravate the symptoms by all possible means while taking every precaution against the reactions of the victims. Russian hostility to and fear of the West has behind it a long tradition based on some bitter experiences.

HERE probably lies the root of the trouble, not only in UN but in Europe. And it was one of the few good features of Mr. Vishinsky's recent speech that it provoked Mr. McNeil into a candid and polished analysis of the trouble. Provided with very clear and firm instructions from London, Mr. McNeil presented a cool, intense and elegant argument which made Mr. Marshall sound a little ponderous and colossal, Mr. Vishinsky more than a little vulgar and hysterical.

He denounced as "nostalgic nonsense or dangerous dishonesty" the pretense that the company of nations that fought Fascism still had today the common aims it had in the war. Relations, Mr. McNeil declared, could not begin to be normal until they had achieved with Germany and Japan a "real, responsible and rational settlement;" nor indeed until all nations accepted "several assumptions that are beyond dispute." Those assumptions are that no nation is omniscient or omnipotent, and that "no nation can expect to have its views accepted at all times by other nations."

IT is unfortunate that public opinion in the United States has had to be aroused to support them by actions and words which have created heat where only warmth was required. Much is being said and written there which must read like "war-mongering" to any Russian official who has placed on his desk a daily digest or clippings from the American press.

Digests of the Russian press and radio comment give exactly the same impression, and were already doing so many months ago, when American policy was hesitant and confused and when friendliness in Britain towards Russia was widespread and politically important.

Even now it is inconceivable that Moscow is not informed by its diplomatic representatives of the eagerness with which press and public seize on hopes of a trade agreement, on a report that Mr. Molotov smiled at Mr. Bevin, on an opportunity to entertain rare visitors from Russia.

It is the refusal to be conciliatory even for tactical purposes that is so bewildering, so impossible to explain save on the assumption that Soviet statesmen believe time is entirely on their side. The latest inexplicable achievement of this diplomacy has been to bring Monsieur Bidault down on the western side of the fence, just at a time when he hoped to remain seated until the November conference.

In this situation it is quite clear on which side Britain must stand. Already it has been humiliated and frustrated by the Soviet use of the veto, and by "those unpredictable inconsistencies" of principle with which Mr. McNeil charged Mr. Vishinsky.

IT is also clear that the British government must join in the struggle to stop the abuse of the veto, to make the machinery of the Security Council work. Its interest in doing so is identical with that of the United States; neither nation wants to maintain large forces, to be forced to think in strategic terms, to abandon the hopes and pledges that went into the Charter of the United Nations.

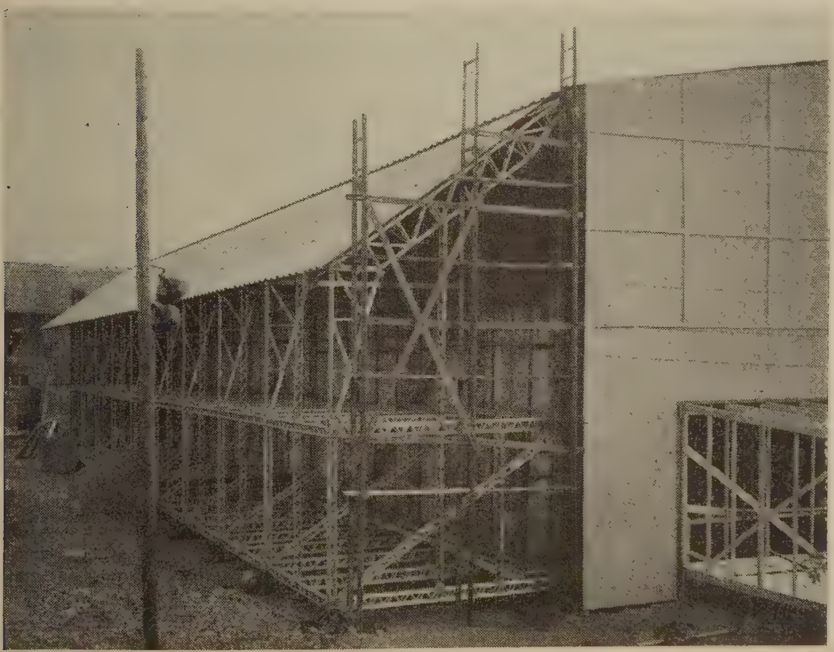
But, at the same time, any British government must reserve the right to form its own estimate of the rightness and timeliness of the moves in Mr. Marshall's present campaign. It must maintain a position from which it can remind the Secretary of State that British forces guard his flanks, that many vital British interests lie far ahead of the nearest American outposts.

The American public, too, has to be reminded from time to time of the futility—if not of the dangers—of barking without the intention to bite—indeed, without the power to bite immediately, and in the right place. To find ways of securing even a slight change in Soviet policy may take years; the attempt may bring moments of danger and sacrifice. At such moments Americans may falter at the prospects revealed by a check or a failure; or a run of successes in the "cold war" might make them overconfident and impatient.

Both possibilities are dangerous, for in both cases the vital objective in relations with Russia, agreement on and the demarcation of vital interests, might be lost from sight. For in international affairs the policy of the United States is still not fully formed; it tends to fluctuate from one extreme to another, instead of pursuing a steady course. The British government should not expect—it certainly cannot demand—to be consulted in every stage in Mr. Marshall's diplomatic offensive.

But it has the right, indeed the duty, to point out mistakes, even to avert and correct them, without incurring official and public reproof from Washington. Neutrality in the "cold war" is not possible for Britain, but an independent and persistent attempt to end it by a negotiated peace may be.

ALUMINUM THEATRE: *Constructed entirely of aluminum, this emergency theatre has been constructed in Hanover, Germany. The total building will cost 2½ million marks. This photo was taken on the ninth day of construction.*



Industrial News Summary...

- ***European Experts Discuss Steel***
- ***Meet Here to Make Export Plans***
- ***Americans Take Cautious Stand***

HIGH British and French government supply officials converged on Washington this week armed with their steel, coal and food requirements. At midweek they were meeting with Washington experts who had been supplied with complete statistics on American steelmaking capacity and production. Barring an unexpected early agreement—a remote possibility—these strategic meetings may be under way for as long as a month.

European demands for steel from the United States under the Marshall Plan had already been whittled down to skeletal form. But the size of even the skeleton has been a bombshell to the American steel industry.

The job this week is to decide if even more whittling can be done—and then present an acceptable proposal to the steel leaders of American industry. It will be a hard row to hoe. Domestic conditions in this country are so greatly affected by the distribution of available steel supplies that any improper unbalance would lead to conditions far out of proportion to the actual tonnage involved.

There is a strong feeling in steel circles here that before any American steel is shipped abroad under the Marshall Plan the government should be certain that the need is there for the specific products requested. Steel leaders privately believe with firm conviction that the end use of the steel must be carefully checked and policed. If they need any stimuli for such thinking, American steel leaders have only to recall what weird shenanigans have gone on in the gray market with so-called legitimate steel.

If European nations receive anything like the amount of steel they have demanded, any estimate as to when domestic steel production will come into balance with demand would only be a wild guess. Until European requests are carefully screened there is not a chance in the world of adequately predicting the steel supply picture in 1948.

A careful check indicates that steel leaders in the country are basically in favor of, and will support, the Marshall Plan. None of them, however, believes that it can succeed at the expense of a serious setback to the American domestic industrial economy. Steel leaders this week fully realize that the Marshall Plan will probably mean compulsory allocation of a certain percentage of American steel output. Once this is done, individual producers lose complete control over a large portion of their product especially if, as expected, a large part of the contemplated Marshall Plan shipments of steel will be in the ingot or semifinished form.

The total tonnages of steel which will ultimately be shipped to Europe under the Marshall Plan will not be a large percentage of total output. But with the domestic steel picture tighter than at any time since the war, the effects of such shipments will far outweigh the actual tonnage involved. This ties in with the steel ingot capacity argument because current ingot expansion plans did not entirely contemplate such a large export volume.

THE Marshall Plan will be an added impetus to steel expansion plans. Contrary to the effect of official statements by steel leaders which appeared to indicate a non-expansion attitude, actual expansion and additional studies in that direction are going forward. Because of the substantial increase in the cost of basic steel mill equipment, emphasis is more and more on exploiting oxygen as a basic factor for increasing steel capacity.

There are still production problems to be worked out before oxygen lives up to some of the wild predictions made for it over the past several months. With the almost universal study and application planned for oxygen in steelmaking, it still gives promise of being the most important factor which will bring about a sound expansion in the steel industry without the drawbacks of overexpansion.

The mere fact that one major steelmaker's experience with recent refinements in oxygen use enables this company to reasonably expect a 13 pct ingot capacity expansion from oxygen alone, opens up the possibilities for this process in the industry as a whole. Further success along these lines may knock expansion plans drawn up by those outside the industry into a cocked hat.

WHILE the industry worries about steel exports and the possibility of a long term tightness in steel, customers' jaws this week were dropping lower and lower. One of the country's most important industrial groups—oil and gas—reluctantly agrees that it may be years before urgently needed pipelines are completed. A survey by THE IRON AGE this week shows the minimum need of 6 million tons of finished steel pipe if the more than 27,000 miles of pipelines now under construction or in the authorization stage, and urgently needed to support the new high level national economy, are to be completed. Yet these pipelines-to-be must compete with other urgent steel needs and the outlook for fulfilling oil and gas industry requirements soon is anything but good.

The steel ingot rate this week is within a point of its postwar high, having advanced 1½ points to 96½ pct of capacity. Reflecting this higher level of operations, scrap markets have turned stronger, but no major price advances have occurred, except at Philadelphia where the heavy melting steel price is up an average of 75¢ a ton. A small increase at Pittsburgh in the average price, together with the Philadelphia advance, has raised THE IRON AGE scrap composite price to $38.08 a gross ton, up 33¢ a ton from last week.

• **CONVERSION DEAL**—Ernest T. Weir, National Steel Corp. chairman, explained to a press conference last week the difficulty a steel producer had in policing to prevent its steel from being sold to other than the original customer. Western Electric Co., desperately in need of steel strip, provided his company with ingots which were rolled into strip. Later, said Mr. Weir, a district salesman reported that some National Steel had turned up where he hadn't expected to see it. Tracing back, Mr. Weir said, his company had found Western Electric had filled its need for that strip by the time the converted material was processed. Therefore, he alleged, it had been sold to Dolan Steel Co., Bridgeport, Conn., which resold it to Joe Gandleman in Detroit, who resold it to Russell Trever in Detroit. Mr. Trever, with another individual, then resold the strip to Bohn Products Co., Detroit, Mr. Weir concluded. The final price was not disclosed by Mr. Weir but it is believed that with normal commissions it would be in the neighborhood of $140 per ton.

• **PHOENIX SHAPES OFFERED**—An offering of 15,000 tons of standard shapes rolled at the former Phoenix Iron Co. mill from billets supplied by the customer has been offered for last quarter delivery by a newly organized shape supply company in Philadelphia. The Phoenix mill was bought recently by the Maremont syndicate which operates it in conjunction with the former Apollo Steel Co. sheet mill.

• **STEEL EMPLOYMENT AND WAGES**—Total employment in the industry in August amounted to 625,200 persons, of whom 532,900 were wage earners with the balance comprising salaried workers, according to the American Iron & Steel Institute. In August 1946, the number of wage and salaried employees totaled 595,600. The average hours worked per week by wage earners amounted to 37.1 in August 1947, compared with 35.9 hr per week in July and 38.5 hr averaged during August 1946. Hourly earnings by employees receiving hourly, piecework or tonnage wages amounted to $1.556 during August which matched the May 1947 record level. This rate was 15.6 pct higher than the average hourly earnings of $1.346 paid during August 1946. Total wages paid in August 1947 amounted to $135,778,000, and combined salaries and wages for the month came to $169,075,000, compared with $163,166,000 in July.

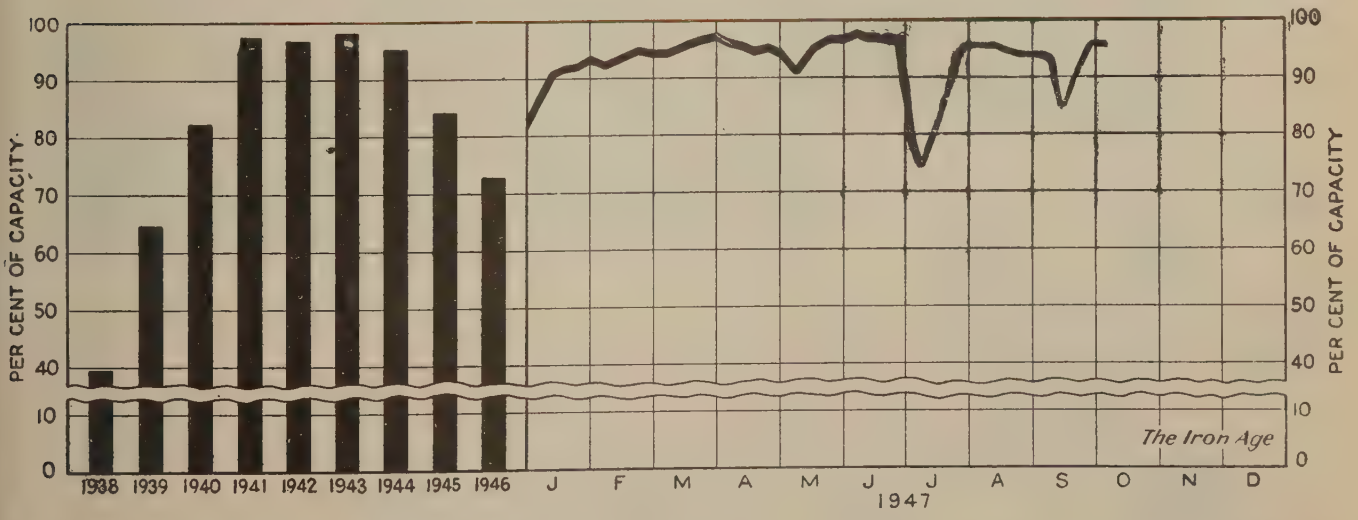
• **PIPE EXPORTS UNDER FIRE**—Three top-ranking administration officials will be summoned to Capitol Hill this week to present a detailed justification for their recent approval of special pipe exports for Saudi Arabian oil fields. Senator Wherry, R., Neb., Chairman of the Senate Small Business Committee, said he would call Secretary of Commerce Harriman, Secretary of Defense Forrestal and Under Secretary of State Lovett to explain why the 20,000-ton export license was approved (THE IRON AGE, Oct 2, p. 114.) Senator Martin, R., Pa., Chairman of the Small Business Committee's Steel Subcommittee, is scheduled to attend the meeting.

• **GRANITE CITY BIDS OPENED** — Missouri-Illinois Furnaces, Inc., Granite City, Ill., with an offer of $3,255,000 was top bidder for the surplus Granite City blast furnace, ovens and equipment now under lease by Koppers Co., Inc. Other bidders were the Tucker Corp. of Chicago, $2,751,000, and Fulton Iron Co. of Cleveland, $2,750,000. The Fulton Co. said it would claim veteran priority. The Kaiser-Frazer Corp. did not bid, claiming that conditions of bidding were obscure as to the amount of pig iron production to be retained by the operator. The high bidder, Missouri-Illinois, is backed by Koppers Co. and M. A. Hanna Coal & Ore Corp., each of which owns half the capital stock.

• **BRITISH FUEL**—According to the British Iron and Steel Federation, the steel industry in its coal-to-oil program will eventually account for 1,300,000 tons out of a planned industrial consumption of 6 million tons of fuel oil designed to save 10 million tons of coal. The work of conversion has been hampered by shortages of materials and equipment, but more rapid progress is expected from now on and consumption of fuel oil should be running at an annual rate of 1 million tons by the end of this year.

• **NEW WIRE MILL**—Allegheny Ludlum Steel Corp. will pay WAA $1.5 million for the Brigham Road Plant at Dunkirk, N. Y., which it operated during the war, H. G. Batcheller, president, announced this week. On three previous occasions the company's $1.25 million bid was rejected, so another $250,000 was added, which WAA accepted. Mr. Batcheller said his firm would spend an additional $500,000 on the installation and move its present wire plant to Dunkirk. It hopes to have the new unit in operation producing stainless steel wire in 60 to 90 days.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 30...	105.0*	95.0	91.5*	92.0	95.5*	102.0	90.0	99.0	103.5*	107.0	96.0	77.5	94.0	95.0
October 7......	105.0	95.5	90.0	92.0	93.5	102.0	100.0	99.0	99.0	107.0	98.5	80.0	94.0	96.5

* Revised.

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More readily obtainable in bars and plates is a wide variety of analyses which assures the opportunity of specifying the material for the job.

4. Savings of Materials
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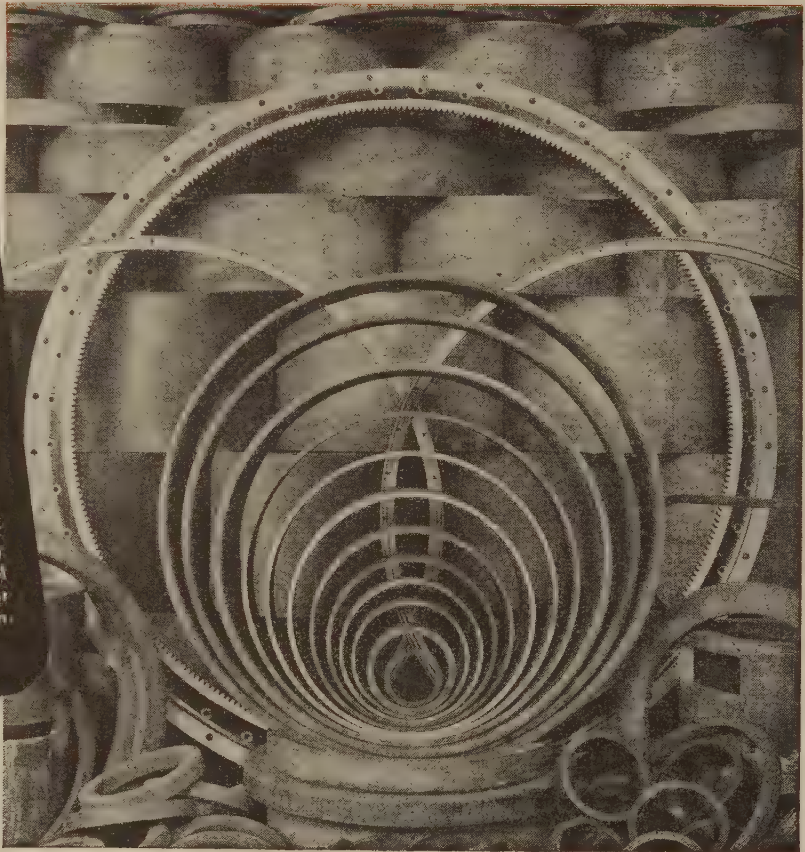

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WANTED - Six Million Tons of Steel

More Than 27,000 Miles Of Pipelines to Be Built In Next Few Years

◦ ◦ ◦

By D. I. BROWN
Chicago Regional Editor

◦ ◦ ◦

Chicago

• • • **Reminiscent of** nearly a century ago when the railroads started expanding westward, is the present huge construction program in all directions by the latest big carrier—the pipelines. Retarded by the war and due to unprecedented postwar demand for oil and gas, the pipeline construction now planned or recently begun totals between 20,000 and 30,000 miles of main transmission lines for natural gas, crude oil and petroleum products. When this program is completed there will be nearly as many miles of pipeline in this country as there is railroad track mileage.

Pipeline crews are not having to battle the Indians or each other for rights of way as did the early railroads. However, just as big a fight is being waged among the pipeline companies for pipe, or more precisely steel. The fight for steel is not due to the direct competition of lines or oil companies in the same area, but rather caused by the current world shortage of steel with the different oil and gas companies striving to obtain their share of plates or pipe, ingots or slabs or any accepted ferrous material which can be converted and used to build a pipeline.

Almost 6 million tons of steel is needed in the next few years to make the 27,220 miles of pipelines which are to be built. Aside for the steel needed for the lines themselves, the requirements for compressors, booster stations, and all the auxiliary equipment adds unknown thousands of more tons of iron and steel needed, without which the lines can't operate.

Oil executives in Chicago point out that the pipelines and auxiliary equipment are but part of the overall program. If the industry is to meet the minimum requirements of our present economy, the drilling of new oil wells must be increased. One oil expert estimated to THE IRON AGE that as a nation we are 65,000 new oil wells behind the number presently needed. This again will require thousands of tons of pipe, casing, bars, forgings, etc. Pipe producers say that the delivery of casing and drill pipe is even worse than line pipe. Storage facilities too must be increased.

Large tonnages of plates to build the tanks are a further load to the already sorely pressed steel producer. The recently developed high pressure underground storage project for natural gas will require large tonnages of alloy seamless pipe. Throughout the north users of oil and gas have under way a rather extensive fuel storage program in their own plants. (See THE IRON AGE, Sept. 4, 1947.) This demand for more tanks, and therefore, more steel is another straw added to the camel's back.

Our refinery capacity, according to informed sources, is current with our needs, but this program, too, must be steadily enlarged with the third branch of the industry eventually calling for more finished steel products. Much of the refinery requirements, however, are for specialized material and not the common carbon steel needed for pipeline construction, storage tanks and well drilling.

Although attempts have been made to treat foreign demands for pipeline as a distinct and separate requirement from domestic needs, some oil men here believe such an attitude is short sighted. These experts contend that if our international program is to continue to supply many parts of the world and ourselves with petroleum or refined products, we must allocate them the steel or pipe to build the necessary facilities to help us meet such a program.

Foreign requirements for pipe

are not large compared to ours, but nevertheless the estimated 600,000 net tons of pipe needed now overseas looks like an impossible requirement in the face of what is presently needed at home. One large mill in the west has practically their entire production for the next year allocated as plates for foreign pipeline construction.

In attempting to develop the actual steel tonnages required for pipelines which have either been authorized or planned, it was found that no figures were available in the oil and gas industry, in the records of the government or in the hands of the various associations of either industry. For that reason the tonnage had to be calculated on the theoretical weights of the size of the pipe for the mileage intended in each and every line.

The various lines contained in tables I, II and III, which are to be built, were secured from the *Oil and Gas Journal*, the *Petroleum Engineer*, the Federal Petroleum Commission and other outside sources. The calculated pipe tonnages calculated by THE IRON AGE, may not be accurate to within plus or minus 15 pct of the actual weight needed for each line, but the total tonnage reached by calculation of all pipe it is believed by pipeline engineers is very close to what will be required.

Pipeline companies told THE IRON AGE that very seldom does the eventual end tonnage of the pipe used in any line correspond with that originally planned. The weight of each size of pipe specified for all lines was chosen as indicated in table IV. On the average, these weights, it is believed, are as close to actual usage as can be had under the circumstances.

In lines where more than one size of pipe is to be used and the exact mileage of each size could not be determined, the weight was arbitrarily calculated on one particular size. The largest size was not always used so it is felt that the overall tonnage figures average out

Table I—Domestic Crude

Symbol No.	Line	Miles	Size Used for Calculation * Inches	Location	Status		Calculated Steel Tonnages Required, Net Tons
					Underway	Planned	
1-C	Standard Pipe Line Co	289	12	Goldsmith to Borger, Tex		X	
2-C	Magnolia Pipe Line Co	650	20	Corsicana, Tex —Patoka, Ill	X		33,235
3-C	Standard Pipe Line Co	197	12–16*	Loops Casper, Wyo —Freeman, Mo		X	136,500
4-C	Standard Pipe Line Co	115	10	Wamsutter—Casper, Wyo		X	32,544
5-C	Standard Pipe Line Co	484	20	Loops—Drumright, Okla to Whiting, Ind		X	10,396
6-C	Standard Pipe Line Co	120	12	Rangely, Colo —Wamsutter, Wyo		X	101,640
7-C	Standard Pipe Line Co	75	16	West Texas Extension		X	13,800
8-C	Utah Oil Refining Co & Standard Oil Co	200	10	Rangely, Colo —Salt Lake City		X	12,390
9-C	Phoenix Pipe Line Co	600	8	Permian Basin—Phoenix		X	18,080
10-C	Midway Pipe Line Co	600	8	Permian Basin—Oklahoma & Kansas		X	30,780
11-C	Texas Pipe Line Co	440	20	Midland, Tex —Cushing, Okla		X	30,780
12-C	Texas Pipe Line Co	80	16	West Columbia—Houston, Tex		X	92,400
13-C	Texas Pipe Line Co	100	22	Houston—Port Noches—Port Texas		X	13,216
14-C	Texas Pipe Line & Shell Pipe Line Co	500	20–22*–24	Jal, N M —Cushing, Okla		X	22,310
15-C	Shell and other companies	1,045	20	Midland, Tex —Wilmington, Calif		X	219,450
16-C	Gulf Refining Co	105	8–10*	Midland, Tex —Lufkin, Tex Loops	X		9,492
17-C	Portland Pipe Line Co	300	20	Portland, Me —Montreal		X	63,000
18-C	Rocky Mt Pipe Line Co	232	8–10*	Lance Creek enlargements		X	20,973
19-C	Humble Pipe Line Co	43	6	Pittsburg Field, Camp County, Tex —Longview		X	1,482
20-C	Sinclair Refining Co	50	18	Loop to trunk system Kansas		X	9,315
21-C	Atlantic Pipe Line Co	50	8	West Texas		X	2,565
22-C	Shell Pipe Line & Texas Pipe Line Co	425	20	Cushing, Okla —Wood River, Ill		X	101,640
	Shell Pipe Line & Texas Pipe Line Co	75	16	Wood River—Salem, Ill		X	
	Total	6,775		Total			1,087,518

Table II—Domestic Product

1-P	Shell Pipe Line Corp	100	6	Sheridan—Deer Park, Tex	X		3,400
2-P	Phillips Petroleum Co & Shamrock Oil & Gas Co	365	6	Borger, Tex —Denver	X		12,410
3-P	Wyco Pipe Line Co	267	8	Casper, Cheyenne, Wyo —Denver	X		13,697
4-P	Magnolia Pipe Line Co	178	12	Beaumont—Hearne, Tex	X		20,470
5-P	Texas Pipe Line Co	150	10	Hearne to Dallas & Ft Worth		X	15,549
6-P	Texas Pipe Line Co	50	6	Dallas to Ft Worth		X	1,700
7-P	Sinclair Refining Co	250	6	Corpus Christi to Austin to San Antonio	X		8,500
8-P	Sinclair Refining Co	190	6	Clinton, Cleveland to Steubenville, Ohio		X	6,460
9-P	Sinclair Refining Co	850	10	Houston, Ft Worth, Dallas, Coffeyville, Kansas City		X	76,840
10-P	Sinclair Refining Co	200	8	Kansas City—St Louis		X	10,260
11-P	Connecticut Pipe Line Co	40	8	New Haven—Hartford		X	2,052
12-P	Cosden Petroleum Co	225	4	Big Spring to Weatherford, Tex		X	5,130
13-P	Great Lakes Pipe Line Co	54	8	Ponca City—Barnsdall, Okla		X	2,770
14-P	Socony-Vacuum Oil Co	235	6	Sioux Falls, S D , Fargo, N D		X	7,990
15-P	Sunray Oil Corp	83	8	Allen to Drumright, Okla		X	4,258
16-P	Socony-Vacuum Oil Co	127	4 & 6*	S Portland, Me to Hollowell & Banger		X	4,318
	Total	3,364		Total			195,804

Table III—Natural Gas

					Authorized	Applied for	
1-G	Border Pipe Line Co	38	8	Rio Grande River to Laredo Tex	X		1,949
2-G	Cities Service Gas Co	32	20	North Welda to Ottawa, Kan	X		6,720
3-G	Michigan Wisconsin Pipe Line Co	810	26	Hansford Co , Tex —Big Rapids, Mich	X		286,195
	Michigan Wisconsin Pipe Line Co	259	22	Hansford Co , Tex —Big Rapids, Mich	X		57,683
4-G	East Ohio Gas Co	95	18	Ohio River to Austintown to Cleveland, Ohio	X		27,989
	East Ohio Gas Co	49	20	Ohio River to Austintown to Cleveland, Ohio			

close to actual requirements. The tonnages thus obtained are contained in tables I, II and III.

Help from the oil and gas companies and the steel and pipe producers was solicited in the effort to obtain the actual steel tonnages required for each line. Because of huge demands for steel, the allocation and delivery of definite tonnages of pipe or steel for any single line is a very tender subject and the oil companies, the pipe makers and the steel mills prefer not to discuss it.

The oil companies contacted plainly stated they did not wish their competitors to know how much steel they needed or would get, and the steel and pipe companies also did not wish the tonnages allocated to each individual consumer to become widely known.

This "iron curtain," it appears, is not solely to keep the individual arrangements secret from any particular steel, oil or pipeline company, but also is intended to keep the other main consuming industries, like the automakers, from being too well informed on how much tonnage is going into pipe and allied products in the oil and gas field.

Without exception, each and every pipe or steelmaker is booked to capacity on the products needed for pipeline construction. One maker of welded pipe is booked solid into 1952. A producer of seamless pipe has 3 to 5 years of business on the books and another seamless maker has accepted over 1 million tons of pipe intended for line use.

Prior to the war the size of pipe used in gas lines was mostly in sizes 14 in. in diam and larger. lines used larger sizes, but the overall requirement for large pipe was not too great. Now, however, most lines to be built require larger diameter pipe. It will be noticed from table III that about 70 pct of the number of gas lines listed are sizes over 14 in.

The production of seamless line pipe over 14 in. in diam is confined

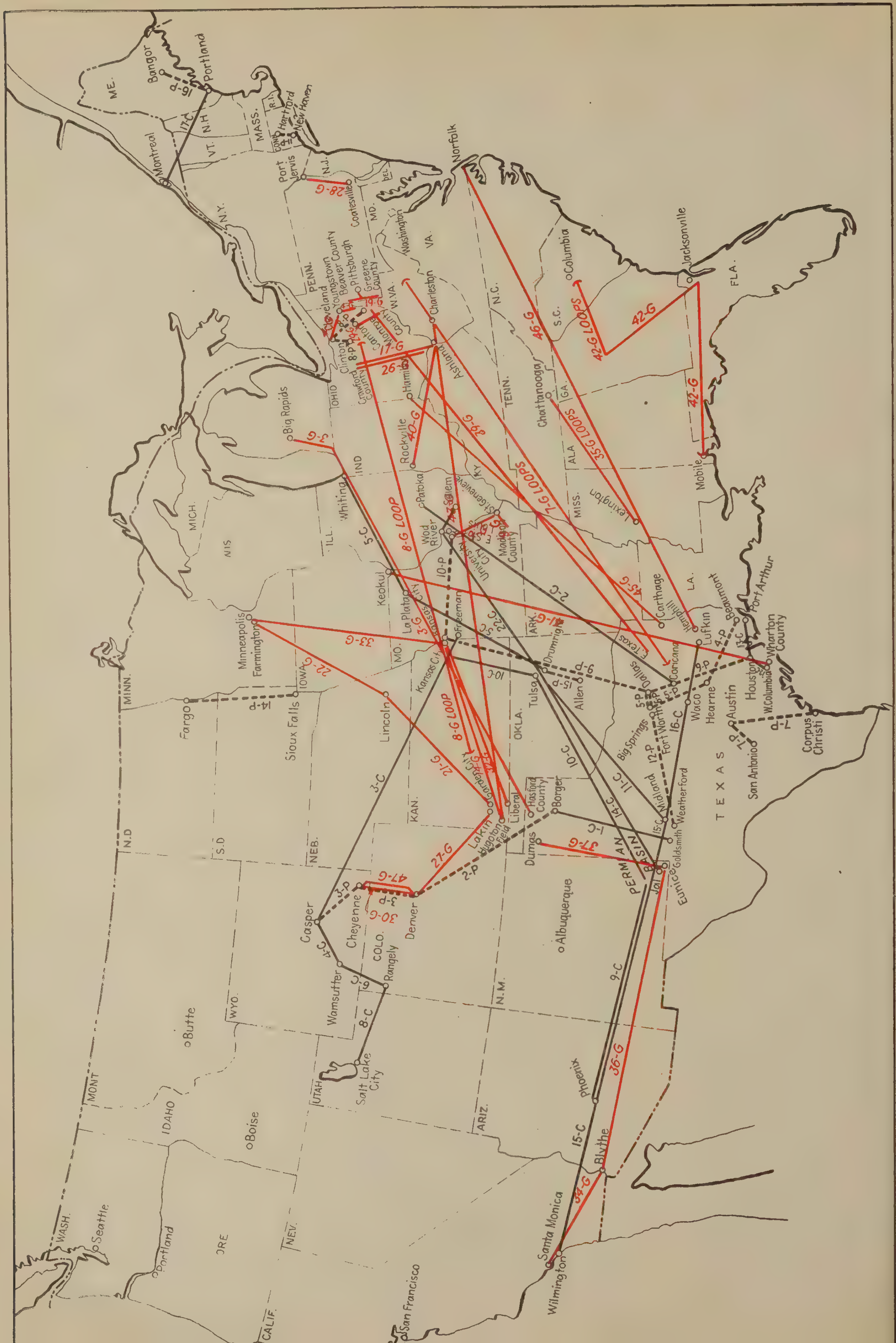
(*Continued on Page* 117)

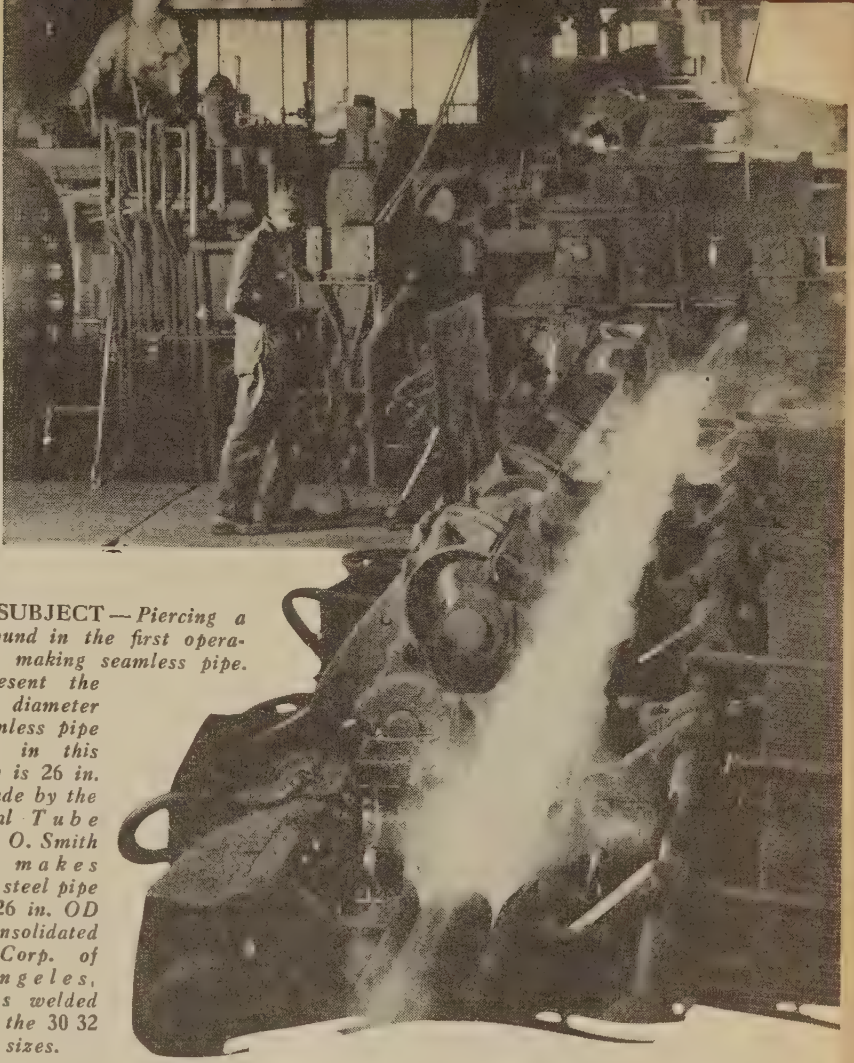
Table III—Natural Gas—Continued

Symbol No.	Line	Miles	Size Used for Calculation * Inches	Location	Status		Calculated Steel Tonnages Required, Net Tons
					Authorized	Applied for	
5-G	Hope Natural Gas Co	28	12	Loops in West Virginia	X		25,865
	Hope Natural Gas Co	58	20	Loops in West Virginia			
	Hope Natural Gas Co	36	12	Loops in West Virginia			
	Hope Natural Gas Co	55	12	Loops in West Virginia			
-G	Cincinnati Gas Transportation Co	70	14	Foster to Means, Ky	X		8,435
7-G	Tennessee Gas & Transmission	400	26	Loops from Texas to West Virginia	X		14,711
	Tennessee Gas & Transmission	10	24	Loops from Texas to West Virginia	X		
8-G	Panhandle Eastern Pipe Line Co	660	18 26 (24*)	Loops in Kan , Mo , Ill , Ind and Ohio	X		218,592
9-G	Mississippi River Fuel Corp	265	22	Loops Madison Co , Mo —St Genevieve, Mo to E St Louis	X		60,732
	Mississippi River Fuel Corp	14	12	Loops Madison Co , Mo —St Genevieve, Mo to E St Louis			
10-G	United Gas Pipe Line Co	17	12	Jefferson Davis Parish, La	X		1,955
11-G	United Gas Pipe Line Co	93	18	Baxterville, Miss —Mobile, Ala			17,326
12-G	United Gas Pipe Line Co	33	20	Carthage—Longview, Tex			6,930
13-G	United Gas Pipe Line Co	13	12	Baxterville Field & Gwinville Field, Miss	X		2,761
14-G	Cities Service Gas Co	405	26	Hugoton Field, Kan to Kansas City	X		15,270
	Cities Service Gas Co	44	6–20	In Kansas	X		
15-G	Michigan Gas Storage Co	150	24	Freedom Jct , Mich , to Winterfield & Cranberry Lakes	X		49,680
16-G	United Fuel Gas Co	70	20	West Virginia—Roane to Monongalia Counties		X	14,700
17-G	United Fuel Gas Co. & Ohio Fuel Gas Co.	100	20	Ceredo, W. Vir. to Crawford County, Ohio		X	21,000
18-G	United Fuel Gas Co.	49	16	Kanawha & Wetzel Counties, W. Va.	X		8,095
19-G	Manufacturers Light & Heat Co.	76	20	Greene County to Beaver County, Pa.	X		15,960
20-G	Northern Natural Gas Co.	150	18-20*-24	Loops, Iowa, Kansas, Minn., Okla., Nebr. & Tex.	X		37,282
	Northern Natural Gas Co.	35	16	Transmission line			
21-G	Northern Natural Gas Co.	320	26	Loops—Palmyra, Neb.—Garden City, Kan.		X	115,040
22-G	Northern Natural Gas Co.	245	24	Loops—Palmyra, Nebr.—Farmington, Minn.			81,144
23-G	Natural Gas Pipeline Co. of America & Texoma Natural Gas. Co.	139	26	Loops Kansas & Nebraska	X		49,970
24-G	Chicago District Pipeline Co.	11	24	Joliet to Chicago			3,643
25-G	Ohio Fuel Gas Co.	88	16	Lorain, Fairfield, Licking & Knox Counties, Ohio	X		14,538
26-G	Ohio Fuel Gas Co.	90	20	Lawrence County to Crawford, Ohio	X		18,900
27-G	Colorado Interstate Gas Co.	260	20	Lakin, Kan.—Denver	X		54,600
28-G	Manufacturers Heat & Light Co.	135	14	Coatesville, Pa.—Port Jervis, N. Y.			16,268
29-G	East Ohio Gas Co.	84	20	Monroe to Stark Counties, Ohio		X	17,640
30-G	Colorado Wyoming Gas Co.	100	8–16*	Cheyenne to Denver		X	16,520
31-G	New York State Natural Gas Co.	166	12–14*–16	Pennsylvania		X	18,677
32-G	Mid-Continent Gas Trans. Co.	400	26	Liberal—Kansas City, Kan.		X	143,800
33-G	Mid-Continent Gas Trans. Co.	438	26	Kansas City to St. Paul		X	157,461
34-G	S. California Gas Co. & Southern Counties Gas Co.	214	30	Blythe, Calif. to Los Angeles	X		67,410
35-G	Southern Natural Gas Co.	138	20–22*	Chattanooga—Lexington, Miss.		X	30,788
36-G	El Paso Natural Gas Co.	740	26	Eunice, N. M.—Blythe, Calif.	X		266,030
37-G	El Paso Natural Gas Co.	248	24	Eunice, N. M.—Dumas, Texas	X		82,138
38-G	East Ohio Gas Co.	50	20	Jackson—Brook Park, Ohio	X		10,500
39-G	Memphis Natural Gas Co.	1,016	24	East Texas to Pittsburgh, Pa.		X	336,499
40-G	Atlantic Seaboard & Virginia Gas & Trans.	268	24	Cobb, W. Va.—Rockville, Ind.		X	88,762
41-G	Trunkline Gas Supply Co.	885	30	Wharton County, Tex.—Keokuk, Ia.		X	278,775
42-G	United Gas Supply Co.	1,500	20	Ala., Fla., Ga. to S. Carolina		X	315,000
43-G	Hope Natural Gas Co.	1,128	22	Hugoton Field, Kan.—Kanawha Co., W. Va.		X	251,657
44-G	Alabama Tennessee Natural Gas Co.	66	10	Tenn. to Muscle Shoals		X	5,966
45-G	Metropolitan Eastern Corp.	825	18	Carthage, Tex. to Hamilton Co., Ohio		X	153,698
46-G	Trans-Continental Pipe Line Co.	1,380	26	Hemphill, Tex. to Eastern Seaboard		X	496,110
47-G	Tennessee Gas & Trans. Co.	105	8*–10	Denver to Cheyenne		X	5,386
48-G	Austin Field Pipe Line Co.	62	6–10–24*	Austin Field to Detroit		X	70,864
	Austin Field Pipe Line Co.	140	26	Austin Field to Detroit		X	
49-G	El Paso Natural Gas Co.	20	8	Phoenix		X	10,312
	El Paso Natural Gas Co.	46	16	Jal to Eddy Co., N. M.		X	
	El Paso Natural Gas Co.	14	14	Jal Plant		X	
50-G	Tennessee Gas Transmissions	191	26	Loops Louisiana	X		285,188
	Tennessee Gas Transmission	300	26	Paralleling main line north	X		
	Tennessee Gas Transmission	69	24	Paralleling main line north	X		
	Tennessee Gas Transmission	82	20	Paralleling main line north	X		
	Tennessee Gas Transmission	83	20	Panola Co., Tex.	X		
	Tennessee Gas Transmission	16	6	Starr Co., Tex.	X		
	Tennessee Gas Transmission	287	12–16*	Tennessee		X	
	Tennessee Gas Transmission	141	3–4*	Laterals in Tennessee		X	
51-G	Penn-York Natural Gas Corp.	65	10*–14	York, N. Y. to Lewiston, N. Y.		X	6,238
52-G	Columbia Gas & Electric Corp.	398	14*–24	W. Va., Maryland, Pa., & N. Y. states		X	47,959
	Tota Mileage	17,081		Total Tonnage			4,553,311

Location Of Pipe Lines

(See table for key numbers)


ME.
Bangor
Portland
16-P
N.H.
17-C
VT.
Montreal
MASS.
R.I.
CONN.
Hartford
New Haven
N.Y.
Port Jervis
N.J.
28-G
Coatesville
DEL.
MD.
Washington
PENN.
Youngstown
Beaver County
Pittsburgh
Greene County
Cleveland
Clinton
Crawford County
W.VA.
VA.
Norfolk
Charleston
17-G
26-G
Hamilton
Ashland
OHIO
N.C.
S.C.
Columbia
46-G
42-G LOOPS
42-G
Jacksonville
FLA.
Big Rapids
3-G
MICH.
WIS.
IND.
Rockville
40-G
39-G
TENN.
Chattanooga
GA.
35-G LOOPS
ALA.
Mobile
Lexington
MISS.
7-G LOOPS
KY.
Patoka
Salem
Ste. Genevieve
Wood River
Madison County
University City
ILL.
Whiting
5-C
8-G LOOP
Keokul
La Plata
Kansas City
Freeman
10-P
22-C
2-C
ARK.
Drumright
45-G
Carthage
LA.
Hemphill
Lufkin
Beaumont
Port Arthur
4-P
13-C
Wharton County
Houston
W. Columbia
Austin
San Antonio
Corpus Christi
7-P
1-P
Hearne
Waco
9-P
Corsicana
Dallas
Fort Worth
5-P
E. Texas
Tulsa
Allen
6-P
15-P
10-C
MO.
3-G
33-G
Minneapolis
Farmington
22-G
IOWA
Sioux Falls
14-P
Fargo
MINN.
Lincoln
8-G LOOP
21-G
Garden City
OKLA.
Big Springs
12-P
16-C
TEXAS
Midland
Weatherford
15-C
10-C
11-C
14-C
Borger
Hasford County
Liberal
Lakin
Hugoton Field
KAN.
N.D.
S.D.
NEB.
3-C
27-G
2-P
Dumas
37-G
1-C
PERMIAN BASIN
Goldsmith
Eunice
Jal
Albuquerque
N.M.
47-G
3-P
30-G
Denver
Cheyenne
Casper
COLO.
Rangely
Wamsutter
4-C
6-C
8-C
WYO.
Salt Lake City
UTAH
Butte
MONT.
IDAHO
Boise
9-C
36-G
Phoenix
ARIZ.
Blythe
15-C
34-G
Santa Monica
Wilmington
WASH.
Seattle
Portland
ORE.
NEV.
CALIF.
San Francisco



HOT SUBJECT—*Piercing a tube round in the first operation of making seamless pipe. At present the largest diameter of seamless pipe made in this country is 26 in. OD made by the National Tube Co. A. O. Smith Corp. makes welded steel pipe up to 26 in. OD and Consolidated Steel Corp. of Los Angeles, makes welded pipe in the* 30 32 *in. OD sizes.*

to one large steel producer. The fabrication of welded pipe over 14 in. diam is done by five companies, two of which don't make such pipe over 16 in. OD. This capacity is not sufficient and the steel industry is planning additional facilities for the manufacture of large pipe. Much of this additional capacity, however, will not be available for at least another year. Republic Steel Corp.'s new electric welded pipe mill in Alabama is planned to start production by late 1948. Entire production of this mill is already, however, entirely sold out.

Meanwhile, the oil and gas companies in the effort to expedite pipe delivery of all sizes of pipe, have scoured the country for plates, ingots or any semifinished steel which they can buy and ship to their sources of pipe — in order to increase delivery of finished material. In these cases the pipeline company pays all the extra freight plus high conversion charges and ends up paying fantastic prices for the needed pipe.

Everyone concerned with the pipeline seems to be getting into the act. A chemical company in Pittsburgh, which is part of a corporation in which another member was badly in need of the product which is to be shipped through a planned line in that community, tried to secure more plates from a steel producer in that town. The steel producer refused to allocate more plates to the pipemaker who had the contract with a pipeline company to build that particular line.

Undismayed, the chemical company secured ingots from two other steel companies, who shipped them to an Ohio plant of the Pittsburgh producer. The Ohio plant of this producer does not roll plates. However, the ingots were used for strip and sheets and as the ingots represented a bonus tonnage, the Pittsburgh producer agreed to ship as many more tons of plates from Pittsburgh to the pipemaker as the chemical company supplied ingots to the Ohio plant for strip and sheets.

The most optimistic observers declare they can see no end in sight in the demand for steel needed in pipeline construction. If the necessary materials could be supplied immediately, they believe the extent of the demand could be predicted. However, none of the consumers are going to get what is needed immediately, and it is evident that the line program may be extended over twice the time originally allowed for completion.

Some oil executives are not unduly alarmed over the steel supply situation. Before the National Resources Economic Subcommittee hearing on the petroleum problem in Washington, one official of the Standard Oil Co. of Ind. said, "Naturally, more pipe for drilling and transporting would be of assistance. However, I feel that the steel industry has done and is doing a remarkable job in supplying the oil industry that tonnage which it is receiving. I am satisfied that the delivery rate will be increased as the pent up demand for many durable goods will become satisfied."

TABLE IV

Pipe Weights used for Calculated Tonnages

Pipe Diameter	Wall Thickness	Weight per Lineal ft.–lbs.	Weight per Mile Net Tons
4 in.	0.188 in.	8.64	22.8
6	0.1875	12.89	34.0
8	0 219	19 64	51 3
10	0 307	34.24	90.4
12	0 330	43.77	115 0
14	0 3125	45 68	120 5
16	0 375	62 58	165 2
18	0 375	70 58	186 3
20	0 375	78.60	210.0
22	0 375	86 61	223 1
21	0 500	125.49	331.2
26	0 500	136.17	359.5
30	0.375	118.54	313.4

Others in the oil industry are not nearly so satisfied with the past or predicted steel and pipe delivery. Independent observers not connected with either the steel or oil companies can't see any more overall steel supply in the immediate future.

All told, the pipeline demand at best represents a long term steel requirement of more alarming proportions as that so widely broadcast concerning automotive needs. True, one requirement is plates or tube rounds and the other strip and sheets, but observers here recall that no matter what product, they all have to come from ingots, which indicates that the subject of our annual ingot capacity may remain a lively topic for some years to come.

Steel Men Talk Oxygen, Hear of New Equipment At AISE Convention

Pittsburgh

• • • **Oxygen as a steelmaking** tool was the hottest subject at the annual convention of the Association of Iron & Steel Engineers held here this fall. Though nothing radically new was presented, the papers brought listeners up to date on the latest oxygen research. Several new developments in steel mill machinery were disclosed and there were design and application talks that interested the steel mill operating men at their Sept. 22-25 meeting here.

Packed sessions marked the oxygen talks, led off by J. H. Zimmerman, Linde Air Products Co., who touched on the intensive test programs carried out in many mills during the past year. E. C. McDonald, Republic Steel Corp., presented data proving that the time to make a heat of steel can be cut as much as 40 pct by using oxygen. But Mr. McDonald pointed up a recurrent problem: Refractory design must be modified to efficiently use the technique.

Describing tests at Homestead works of Carnegie-Illinois Steel Corp., J. N. Hornak said maximum rate of carbon elimination in an openhearth will take place with oxygen above 90 pct purity, which, however, didn't indicate high purity oxygen as the most economical. Agitating a bath with an inert gas such as nitrogen actually increased carbon elimination, he disclosed. Harry W. McQuaid and F. E. Pavlis, Air Products, Inc., remarking that steelmaking use of oxygen depends on cost, described equipment to generate lower cost oxygen directly in the steel plant.

The trend to faster rolling mills has brought about a number of twin-drive installations which were described at the electrical session by R. H. Wright of Westinghouse Electric Corp. Later, A. D. Howry, Alan Wood Steel Co., described "The Operation and Maintenance of Variable Voltage Control Systems." C. Lynn, Westinghouse Electric Corp. and W. H. Burr, Lukens Steel Co., explained how the use of laminated steel frames instead of the conventional steel frames improved operation by reducing sparking during transient load changes on reversing mill dc generators.

An award winning paper was that of Ross E. Beynon, Carnegie-Illinois Steel Corp., who traced roll design from the early days to the present in his talk, "Applications of the Basic Principles of Rolling in Roll Design." Lively interest was aroused in a paper by A. B. Montgomery and W. M. McConnell, Mackintosh-Hemphill Co. They described their firm's new "Y-mill." A new type of cold strip mill with its rolls arranged in a "Y" formation, it appears to have excellent production possibilities for very thin gages of cold strip with a minimum of camber. It also appears that the mill may be somewhat less costly than some present equipment.

Another paper well received described a new stainless steel slab or billet grinder and a unit for wet grinding stainless steel sheet or strip. These were covered by A. E. Hamilton, Jr., Hamilton Pump Co. (Details of the latter appeared in THE IRON AGE, Aug. 14, p. 65. More data on the slab grinder will appear in an early issue.—Ed.)

A paper by H. R. McLaren, Timken Roller Bearing Co., detailed piercing operations on a Mannesmann piercing mill. "The Powder Process in Stainless Steel Production," or an explanation of a flame scarfing and cutting process for stainless steels was the subject of a paper by C. J. Burch and E. M. Holub of Linde Air Products Co. L. H. Brown, Wheeling Steel Corp., this part of the program with a talk on job evaluation.

Following a morning tour of the war-built Carnegie-Illinois Homestead works, an afternoon session on lubricants was opened with a description of the family of nonhydrocarbon synthetic lubricants known as polyalkylene glycols. W. H. Millett, Carbide & Carbon Chemicals Corp., was the speaker.

One of the standardization sessions was essentially a crane symposium, with talks by Marc de Ferranti, General Electric Co. and Prof. C. W. Muhlenbruch, Carnegie Institute of Technology. A session on operating practice heard Preston E. Jordan, Wheeling Steel Corp., discuss preparation of coal for coke production. Ragnar Berg, Koppers Co., described some of the latest coke oven machinery and three Arthur D. Little Co. engineers presented the latest research reports on high top pressures in the blast furnace. They were: B. S. Old, E. L. Pepper, and E. R. Poor.

BIG SHOT: *Saving time in laying railroad tracks by means of a velocity power rail punch, the Ford worker is shown tapping the hammer which detonates a shell firing a die through a half inch of steel rail. (See* THE IRON AGE, *Newsfront, Aug. 26, 1947.)*

Backlogs Still Worthless as a Measure of Steel Activity

Alloys Are Highly Competitive But Sales Are Believed Still Above Prewar

° ° °

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

° ° °

Pittsburgh

• • • **Backlogs as a measure** of the health of a steel company are still utterly worthless. Not for the specialty producer, of course, but for the larger companies making carbon sheets, strip, plate, pipe and the other hard to get products. This statement may dismay some statisticians who frequently question the steel executive on the size of his company backlog. The steel producer, not the customer, now decides the size of his backlog because most of the business is on an allocation basis. And on the high-demand items delivery time is reported equally useless as a measure of potential operations.

The stainless and alloy business looks relatively poor today. But according to sales executives who are constantly checking the picture, this doesn't for a minute mean these products are flat on their respective backs. These are among the few fields where size of backlogs — were they generally known—would be a good index. But not an infallible one unless consumer inventories in these lines are known and balanced against inventories of other steel products.

Stainless producers are actively going after business. Some quote normal stainless sheet delivery time at about 2 months. But they are competitive, and if a customer must have sheets in 3 weeks he can generally get them in that time, or perhaps better it a bit.

The alloy steel line is also definitely competitive; but again, it is far from down and out. Perhaps the best explanation heard in steel circles for the pressure now being applied by alloy sales departments is the tremendous expansion in alloy steel capacity during the war.

Sales officials in this line are concerned over the lack of production and shipment data on true alloy steels although it is reported that some steps are being taken to correct the data. They say that most steel firms do not include high strength low alloy steels and electrical sheets in their alloy picture but that unfortunately the only published figures available do include those items. Probably a fair estimate would still place alloy sales above the prewar figures. Delivery can be had in 2 to 5 weeks from most mills on most products. Many analyses are, of course, stocked in rough form because of the greater efficiency of pouring a full heat of a popular type even though orders on hand don't justify it.

Sheet steel is as tight today as it was at the beginning of this year, when everyone figured it was too heavy then to last past the middle of this year. The regular customer —who receives his allocations on a historical basis—has only to place his order a few months ahead of time. For others, delivery time is indefinite, depending on the special situation.

Plate is surprising many in the industry by running sheet a close second on the heavy demand side of the scales. Pipe lines are taking a big slice of it; the freight car builders, oil and gas tank makers are in for big tonnages. And perhaps due to the pig iron scarcity, plate use on machine beds and similar products is reported increasing.

At present, and for the year 1947 to date, shipments of sheared and universal plate are proportionally heavier than they were before the war. Naturally they went up sharply during the war, but the expected drop to the prewar position has not materialized. The following table, from American Iron & Steel Institute data, shows the percentage of plate (sheared and universal) to total steel shipments,

° ° °

ALL STEEL PANEL: *Using about a ton of steel per board, this new poster board uses 20 gage Armco Steelox with framing of porcelain enamel trim. More than 1000 such panels have been erected, mainly on the West Coast.*

° ° °

with an average for prewar and war years:

Year	Pct to Total
1935	6.1
1936	7.4
1937	8.8
1938	7.6
1939	8.0
Average	7.6
1940	9.1
1941	9.8
1942	18.9
1943	20.3
1944	19.4
1945	11.5
Average	14.9
1946	8.5
1947 (incl. Aug.)	10

In construction steel, one might expect delivery on fabricated concrete bars ordered now sometime late in the second quarter of 1948. In proportion to total shipments, production of this item is considerably better than it was during the last few years of the war but percentage-wise it is still about 16 pct under the average for the prewar years 1935 to 1939, inclusive. Sheet piling has almost as big a backlog as concrete reinforcing bars, with early second quarter delivery about the best the buyer can hope for. In this line, backlogs have a tendency to build up because much of the customer's business is on an award and contract basis, and more advanced planning is required.

November and December delivery is obtainable on electrically welded tubing. Generally mechanical tubing business is excellent though some sizes are easy. Pressure pipe, especially in the smaller sizes, is among the tighter items. Line pipe and oil country goods are critically short, and while producers report they have accumulated some backlogs—notably in line pipe—it is said that there are huge tonnages of unplaced line pipe orders all over the country and some pipe fabricators are booked for the next 2 or 3 years.

Nail manufacturers have generally limited backlogs to about 3 months' production. Merchant wire is tight and manufacturers wire is being allocated on a quarterly basis. Wire rope deliveries are reported at 2 months.

Following some easing in cold-finished bars a number of producers swung into the hot-rolled bar market and picked up some orders. Fourth quarter hot-rolled bar allocations are on about the same basis as they were during the past quarter. Cold-finished bar inventories are believed largely responsible for the decline in this line. They are estimated by one reliable source at about twice the size required for current business volume.

High strength low alloy steel sheets are about as tight as carbon sheets. Some producers are continuing the practice of asking customers to sweeten up their carbon sheet orders with a little low alloy sheet business. At least one has taken a strong stand against this, preferring to let the higher strength steel stand on its own. This company is looking ahead to the day when the high strength low alloy steels will be sold on their own merits and is cultivating these customers now.

JOBS FOR SIGHTLESS VETS: *Dale Lawton, a blinded war veteran, explains his job of assembling tool kits at the assembly plant of the Chevrolet Motor Div., Janesville, Wis. The demonstration was made recently in Chicago at a convention of the Blinded Veterans Assn.*

Accepting Bids for Blast Furnaces and Coke Ovens

Washington

• • • **New** bids for the government's $8 million Granite City blast furnaces and coke ovens have been asked for by WAA and must be received by Oct. 6. Two previous offers have been declined as inadequate.

Fulton Iron Co. bid $1,750,000 while Curran Carbonizing & Engineering Co. offered $2,250,000 payable over 15 years without interest.

The facility, consisting of two blast furnaces and byproduct coke ovens, is now being operated under lease by the Koppers Co. Under the formula for bidding, a minimum of $2,250,000 sales price is established and the successful purchaser must be prepared to take over operation without interruption.

Also, the buyer must buy Koppers inventories of raw materials, usable operating supplies, and repair materials, all to be paid for at cost price.

Valve Foundry Sold

Washington

• • • **WAA's Real** Property Review Board has recommended that a government-surplus steel foundry in Indian Orchard, Springfield, Mass., be sold for $916,500 cash to the Chapman Valve Manufacturing Co., the war-time operator.

The foundry has an appraised fair value of $1,100,000 and has a capacity of 12,000 tons per year. It formerly manufactured steel valves.

Weekly Gallup Polls . . .

Eisenhower Leads Truman in Presidential Popularity Poll

Princeton, N. J.

• • • **Even though** Gen. Dwight D. Eisenhower is one of the five most admired men in the country today, the average American voter has not, up to now, thought of him particularly in terms of politics. Comparatively few voters volunteer the name of Eisenhower when asked about possible presidential candidates for 1948 and fewer than two fifths say they would like to see him run, according to George Gallup, director, American Institute of Public Opinion.

But a great deal of potential strength for an Eisenhower candidacy is shown in an institute survey pitting the General against President Truman in a presidential "trial heat."

At this early, and inconclusive, stage before the 1948 election, General Eisenhower runs ahead of Mr. Truman in popularity. The General has denied any intention of becoming a candidate, and most voters do not know whether he is a Republican or a Democrat since he has never openly expressed himself on the matter.

But here is how voters look upon the two men at the present time:

"If the presidential election were being held today, and General Eisenhower were running for president on the Republican ticket against Truman on the Democratic ticket, how do you think you would vote?"

	Pct.
Eisenhower	48
Truman	39
No opinion	13

Exclusive of the no opinion, the vote is 55 pct for General Eisenhower, 45 pct for Mr. Truman.

Political observers would be ill-advised, however, to jump to the conclusion that the General can necessarily beat Mr. Truman in 1948. Paradoxically, General Eisenhower might lose popularity if he became a candidate.

His greatest strength as a popular figure is his aloofness from partisan politics. Were he to become identified with the Republican Party and all it stands for, as he inevitably would as a candidate, a great many Democrats who admire him, and whose admiration is reflected in today's poll, would undoubtedly part company with him. In short, the General's nonpartisan popularity might not translate itself into winning votes on election day after a partisan campaign fought along Republican and Democratic lines. The current poll shows that 27 pct of Democratic voters favor General Eisenhower at present. But no one can tell now how many of those Democrats would, on election day, actually cross party lines to vote for him if he ran as a Republican.

A recent "trial heat" pitting Mr. Truman against a man whose party connections everyone in the country knows, Gov. Thomas E. Dewey of New York, showed a much closer race.

The results, reported in July, were 46 pct for Mr. Truman, 44 pct for Governor Dewey and 10 pct without opinions. Excluding the no opinion the vote was 51 pct for Mr. Truman, to 49 pct for Governor Dewey or, in other words, about an even race.

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Public Sentiment in Revising The Taft-Hartley Act Declines In Most Recent Opinion Survey

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• • • **Organized labor's** campaign to revise or repeal the Taft-Hartley Act continues to have considerable support from the American public.

In the latest test of sentiment on the Act an institute survey finds that nearly half of the voters who have heard or read about the law think it should be either revised or repealed outright.

However, the proportion favoring revision or repeal is not as high today as in a similar survey reported in August.

From coast to coast voters were questioned as follows:

"Have you heard or read about the Taft-Hartley Act which deals with labor unions?"

A total of 72 pct said they had heard or read about the act, while 28 pct said they had not. Last month only 61 pct had heard of the act.

Those who had heard or read about it were next asked:

"Do you think the Taft-Hartley Act should be revised, repealed or left unchanged?"

The vote today, as compared to August, follows:

	TODAY		Aug.	
Revised	27	45 pct	32	53 pct.
Repealed	18		21	
Left Unchanged	28		22	
No opinion	27		25	

Members of labor unions polled in the survey voted by 58 pct in favor of revision or repeal, 19 pct for no change and 23 pct undecided.

A rather marked difference in attitude toward the act is found among Republicans and Democratic voters throughout the nation, as the following table indicates.

	Dems.		Reps.	
Revised	29	55 pct.	24	33 pct.
Repealed	26		9	
Left Unchanged	17		42	
No opinion	28		25	

In thinking about changes in the law, voters apparently do not have in mind any revision of the section which requires union leaders to certify that they are not Communists before unions can take disputes before the National Labor Relations Board.

This controversial feature of the bill, which John L. Lewis and other labor leaders have said they will defy, was put up to voters in an additional question in the poll, as follows:

"The Taft-Hartley Act requires officers of labor unions to swear that they are not Communists before they can take a case before the National Labor Relations Board. Do you think Congress should or should not change this provision?"

The vote of all who have heard or read about the Taft-Hartley Act is:

	Pct.
Should change it	18
Should not	64
No opinion	18

Special Report . . .

As the Auto Industry Sees Steel Shortage Picture

° ° °

By WALTER G. PATTON
Detroit Regional Editor

° ° °

Detroit

• • • **As many Detroiters** see it, if only the steel industry now had enough capacity to furnish flat-rolled steel for 6 or 7 million cars and trucks in 1948 all of the problems now confronting the motor industry would quickly vanish into thin air.

For many months now the steel industry has been the whipping boy for most of the auto industry. If only the steel shortage could be licked, these sources say, the automakers would quickly roll up terrific new car production. That car you've been waiting for so long and patiently would be available in a hurry, they say. Many people even assume that the much maligned auto dealers could be brought quickly into line if only the steel industry had been foresighted enough to provide the necessary steel to meet the auto industry's unprecedented demands.

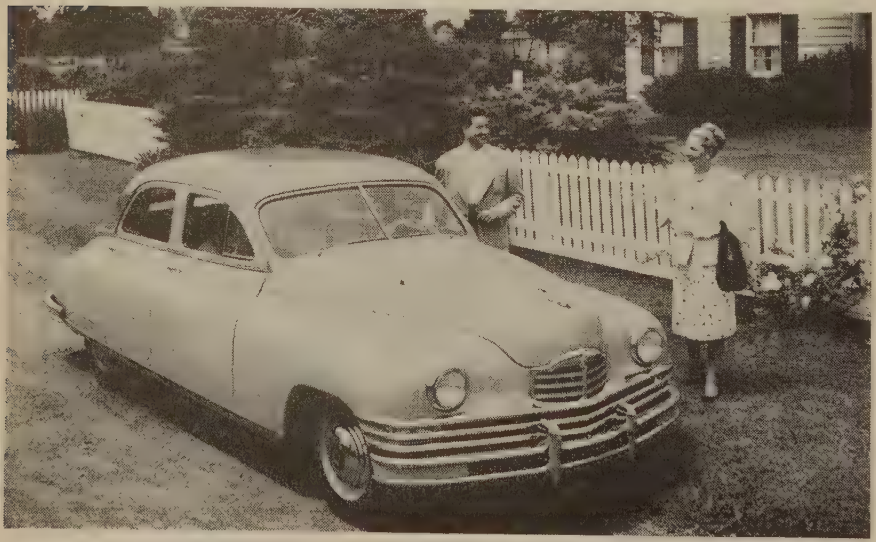
Informed sources here, however, are quick to point out that blaming **all** of the auto industry's problems on the steel industry conveniently ignores many conditions which now get little attention simply because the auto industry's first problem is steel.

For instance, M. E. Coyle, executive vice-president of General Motors, recently told the Pennsylvania Automotive Assn. at Atlantic City that the auto industry is not at all certain of an adequate quantity of pig iron, copper, lead, zinc or tin. These basic materials have not so far limited auto production, Mr. Coyle said, but "this was only because the limits imposed by steel did not test the market for these other critical items."

Bona fide spokesmen for the auto industry are usually temperate in their criticism of the steel industry although occasionally a Walter Reuther or a casually informed editorial writer goes off the deep end and takes the steel industry to task as profit-hungry monopolists hell-bent on delivering the country into the hands of the Communists.

With newspaper headlines constantly blaming the steel industry for every plant shutdown in the Detroit area, it is not to be wondered at that many of the facts which have a definite bearing on the situation are completely ignored. It was not until several days ago, for example, that Henry Ford II called the public's attention to the fact that the amount of steel used by U. S. alone in World War II would make 230 million automobiles—one for every man, woman and child in North and South America. Since that time, it has been easier for many Detroiters to understand the scrap problem.

YOU CAN STILL TELL IT'S A PACKARD: *Packard's traditional grille lines, originated in 1904, are still evident in this new eight cylinder 1948 touring sedan. A part of the front end design, the grille admits huge quantities of cooling air. Longer and bigger bumpers and new ventilating systems are going to add considerably to the amount of steel required for the postwar cars.*



Another fact that is consistently overlooked here is that despite this staggering loss in raw materials, particularly the scrap loss, the steel industry actually produced 26 pct more steel in 1946 than in 1939. Also, during 1947 it will deliver steel to the auto industry at a rate that despite recent setbacks may permit the industry (U. S. and Canada) to produce 5 million cars and trucks, the second largest year the industry has ever head. This peak production is being superimposed, of course, on top of an all-time record output of trucks, replacement parts and accessories. Yet the steel industry, battling for its good name as it faces charges of monopoly and black marketing, is at present in no position to claim thanks for its part in making possible this achievement.

The explanation of steel representatives here that the steel industry has lost 16 million tons of output since V-J Day because of strikes and material shortages too often falls on deaf ears. Thus far most Detroiters have chosen to ignore completely the fact that if to this loss is added the amount of steel production lost because of mill breakdowns, poor coke and low grade scrap it can be readily argued that **inability to use existing steel facilities** may be at least as much to blame for keeping down steel supplies as actual failure to provide new capacity at three times the cost of prewar ingot capacity.

Also forgotten or overlooked in the present welter of controversy about steel is the challenging fact that at the present rate of delivery

1947 steel shipments of cold-rolled steel may equal 9 million tons compared with only 7,800,000 tons during the record year of 1929.

Some authorities here have estimated that sheet and strip tonnage turned out by the entire industry may hit 18 million tons this year compared with 12,325,257 tons in 1940. Thus, the increased production in flat-rolled products as compared with 1940 is substantial despite many charges to the contrary.

Many steel executives here are constantly being reminded, however, that the fact that the steel industry has done a good job with the equipment available doesn't help much to solve the riddle that 16 million cars and trucks that would normally be built were not produced during the war years. The auto industry claims that at its present rate of production it is not even able to replace all the cars and trucks that ought to be retired. The pressure to replace this 16 million vehicles grows with each passing day, and some of the pressure on auto executives is, in turn, passed on to steel managers.

The question as to whether the auto industry is receiving its rightful share of steel is still unsettled although most sources here agree that the present 14.6 pct of all steel produced compares favorably with the prewar figure. The published statistics continue to show, however, that the percent of sheet and strip is below the prewar percentage although no satisfactory explanations have been offered to indicate that any items other than sheet and strip are being received at greater than the prewar rate. (This condition would have to apply if the total percentage of steel directed to the industry compares favorably with the prewar figures.)

Informed sources who have studied the figures of steel distribution are well aware however that reports by individual steel companies to the American iron and steel industry may be understandably inaccurate to the extent that a company, for example, which produces auto wheels, agricultural equipment parts and heating units and buys its steel through a central purchasing agency may find it difficult to allocate the steel properly to a given industry. Also, the fact that steel used for replacements parts and accessories cannot be separated from the new car and truck requirements is bound to add to the confusion when the lowest common denominator—the number of new cars and trucks produced—is invariably used to measure the effectiveness of the steel being delivered to the industry.

Another important but unpublished fact that is being ignored here is that the number of tons of steel which reaches the auto industry through conversion deals is not identified as such in the AISI reports. Although the exact number of tons of steel involved is not known, informed sources place the number of ingot tons at about 60,000 tons per month. When the steel tonnage which is rerolled (but not melted) by special arrangement is added to this total some authorities here believe that the amount of steel involved in conversion deals may be in the vicinity of 100,000 tons per month.

If this figure is reliable, the total flat-rolled steel not shown in the regular AISI reports may reach 7 pct of the total auto sheet and strip tonnage this year or considerably more than enough to offset any deficiency in the present percentage of sheet and strip being officially allocated to the auto industry.

The fact that a 60 pct increase in cold-rolled capacity from 6 million tons today to 9.6 million tons is expected by the first quarter of 1949 will not of course, be fully reflected in the 1948 car and truck output. Some of this capacity will undoubtedly not be operating until late in 1948. Other conditions are expected to keep auto output down until late in 1948.

Ford, for example, will undoubtedly be closed down for 3 to 6 weeks for the most revolutionary model change the company has had since the introduction of the Model A. Chevrolet and Plymouth will undoubtedly follow the Ford lead during the year. In addition, many other large volume producers in the industry may be expected to bring out their postwar lines of cars once Ford has broken the ice.

Informed sources here believe that even if steel is available in adequate amounts at all times it would appear that an increase of as much as 10 pct in the output of cars and trucks in 1948 will be about all that can be reasonably expected. In this event, the present criticism of the steel industry can be expected to subside somewhat although the public is not likely to forget quickly the alleged limitation on motor car output that has rightly or otherwise been blamed for months on the steel industry.

HOLD THE PHONE: *A sales manager of a manufacturing company in the Chicago area has recently installed a radio mobile telephone unit in his car in order to keep in touch with his office while on trips. He says the telephone saves a lot of time, keeps things moving at the office, and holds down the usual stack of mail.*

Expanding Capacity At National Steel; Weir Hits Back at Critics

Pittsburgh

• • • **National Steel Corp.** is expanding capacity by 20 pct with the major part of the gain slated to come from new oxygen equipment, Ernest T. Weir, chairman, announced last week. Blasting critics who allege that the steel companies are deliberately withholding capacity to maintain prices, this outspoken steel producer asserted that his company's basic policies on expansion had never changed. Neither does he believe that those of any other producer have changed though he hinted that perhaps they simply hadn't been given enough publicity. The industry has always expanded ahead of sales in peacetime, he said.

National Steel's expansion is proportionally greater than the overall industry figure of 2.5 million tons recently given by Walter S. Tower, American Iron & Steel Institute president. Part of the significance of the National Steel expansion program can be seen in the fact that of the approximately 800,000 tons to be added, about 500,000 tons will come from installation of an oxygen plant at Weirton Steel Co., to be followed by a second oxygen plant at Great Lakes Steel Co. The entire program will be completed by the end of 1949. It has previously been reported that the Weirton oxygen unit would be built by Air Products Co.

Mr. Weir remarked that much of the capacity talk was ill-advised because the boosters usually ignored the raw material situation. Scrap, he said, is "desperate." Good quality coal is also critically short, he asserted. The critics have also overlooked the fact that the industry they even accuse of plotting to reduce capacity has spent more than a billion dollars on construction since the war and plans to spend several hundred million dollars more. He also stressed the fact that across-the-board construction would cut current steel supply because of the 4 tons of steel required for each additional 10 tons of capacity.

The principal initial interest in oxygen at National Steel will be in the blast furnace. At the same time, the chairman declared, "we will develop its application in the bessemer and openhearth processes. Our estimate of the increase in ingot capacity is based on almost 2 years' work with our present small plant at Weirton. We believe it conservative to predict that a minimum increase of 20 pct will result from this new development."

The Weirton oxygen installation will consist of a single-unit plant with a capacity of 400 tons a day—the first of its size in the steel industry. Study will be given, Mr. Weir noted, to the problems of refractories and charging equipment, and he believes that over the long run the use of oxygen may result in fundamental changes in furnace design and construction.

"If by waving a magic wand, ingot capacity were doubled overnight, the adequate capacity would be of no use without an adequate supply of raw materials," Mr. Weir warned. He then went on to describe the futile efforts of himself and others, not only to prevent export scrap before the war but to get battlefield scrap back from Europe and the Orient. Admitting that nothing could be done about what had been exported Mr. Weir said he cited the situation merely to point up the fact that it is the tendency of people in government to fasten on industry the blame for situations caused in part by government.

National Steel's expansion program thus outlined, will cost about $75 million Mr. Weir concluded.

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Cleveland

• • • **It would take** more than 2 years to expand the capacity of the nation's steel industry by 10 million tons annually, C. M. White, president, Republic Steel Corp., told members of the American Gas Assn. at their Cleveland meeting. Mr. White said an additional 1,500,000 tons of finished steel now desperately needed would have to be taken from steel users today to build the new furnaces, mills and other facilities. Under today's high construction costs, he added, 1 million tons of increase, which might be regarded as Republic's share of the national total, would represent an investment of well over $200 million. Because of abnormal construction costs the steel turned out in these new facilities would have to be priced at least $20 a ton higher than the present.

Blast Furnace Capacity and Production—Net Tons

			PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
	Number of Companies	Annual Blast Furnace Capacity	August	Year to Date	August	Year to Date	August	Year to Date	August	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	11	12,551,280	921,393	7,203,466	32,238	207,307	953,631	7,410,773	89.4	88.7
Pittsburgh-Youngstown	17	25,042,040	1,912,638	15,163,027	17,989	124,353	1,930,627	15,287,380	90.7	91.7
Cleveland-Detroit	6	6,557,500	438,845	3,873,611			438,845	3,873,611	78.8	88.7
Chicago	7	14,097,710	1,070,630	8,287,906			1,070,630	8,287,906	89.4	88.3
Southern	8	4,924,670	308,854	2,571,123	9,817	76,152	318,671	2,647,275	76.2	80.7
Western	4	2,536,000	204,153	1,468,732		11,297	204,153	1,480,029	94.7	87.6
Total	37	65,709,200	4,856,513	38,567,865	60,044	419,109	4,916,557	38,986,974	88.1	89.1

Source: American Iron & Steel Institute

Ford Now Expanding Steel Works; Will Need Less Scrap

Detroit

• • • **Ford Motor Co.** is making an $18 million dollar addition to its steel facilities. According to sources close to the Ford program the move is being made to balance out the Ford steel and foundry facilities and to eventually take Ford out of the market for steel scrap.

It is expected that the program will be completed in part by the time Ford goes into production on its postwar cars next year.

This week Ford is expected to announce construction of a new blast furnace with a daily capacity of 1400 tons, transfer of a 48-in. skin pass mill from Granite City, Ill. Steel Corp. to the Rouge, enlarging of ore and raw material storage and the purchase of additional materials handling equipment. The mill, a reversing single stand 4-high unit was built by United Engineering & Foundry Co. Ford has placed a contract with United to rebuild and widen this mill to 84-in. Delivery of the mill to Ford will not be made until Granite City has its new tandem mill in operation—about 60 days.

Other projects complimentary to the rolling mill operations will be constructed it is reported, including rebuilding of some of Ford's openhearth facilities. A Ford spokesman recently denied that Ford is planning to use oxygen in its openhearth operations.

Ford officials have indicated that the move is being made primarily to balance out the Ford steel and foundry operations. Annual rated capacity of the present Ford blast furnaces is 504,000 tons. Its openhearth capacity is rated at 967,420 tons and the potential capacity for cold rolled sheets has been reported to be 182,000 tons.

At the present time it is believed that Ford is purchasing about 50 pct of its steel requirements from outside sources. Most sources here believe that the total increase in Ford sheet steel output will not be as significant as the fact that it will release much-needed steel to other users in this area. It is also expected that considerable relief for hard-pressed scrap buyers in this area will result from the new Ford blast furnace program.

Arthur G. McKee Co. of Cleveland will build the blast furnace and construction is expected to get under way in November or December 1947. Construction is scheduled to be completed in September 1948, and will result in an increase of 98 pct in Ford's blast furnace capacity, making possible diversion of the entire output of a blast furnace to Ford's foundry.

The rolling mill facilities are expected to be operating in March 1948. Most sources here believe that Ford coke-oven capacity is sufficient to handle the total Ford requirements including the newly installed capacity.

While the effect of the new program on Ford's 1948 car production is expected to be limited, the long range benefits of the new installation are expected to be substantial.

To Junk 16 Jap Vessels For U. S. Scrap Metal

Washington

• • • **Junking of 16** Japanese vessels will supply about 15,000 tons of scrap metal for U. S. consumers, the Army Dept. estimated last week.

The 16 vessels are a part of the U. S. share of the former Japanese fleet. Invitations to bid will be issued soon by General MacArthur's headquarters, the Army said. Bidders must agree to return the scrap to the U. S.

The Army explained that all operable Japanese warships of destroyer size or smaller (except sunken submarines) have been equally divided among the U. S., U. K.. USSR, and China. The U. S. probably will agree through the State, Army and Navy Depts. to scrap most of its share.

Information as to availability of the ship scrap may be obtained from 8th Army Headquarters, APO 343, c/o Postmaster, San Francisco.

Surplus Imports Extended

Washington

• • • **Imports of surplus** carbon steel now may continue until Jan. 1, 1948, under provisions of a new State Dept. ruling. In an order issued by the department's Foreign Liquidation Commissioner, import authority is extended 3 months from Oct. 1 on the following surplus items: Carbon steel, steel containers, steel shipping barrels, drums and pails.

Also cylinders of compressed gas, burlap bags and strips and telephone and telegraph equipment including but not limited to lead covered cable; line, messenger and drop wire; pole line hardware; outside plant communication equipment; central office equipment, including switchboard positions, and miscellaneous telephone apparatus.

To Study Problems Of Ammonium Nitrate

Washington

• • • **Billings Wilson,** of the American Assn. of Port Authorities, has been named chairman of a new government committee to study methods of controlling ammonium nitrate combustion aboard ships.

Other members of the committee are Warren N. Watson, of the Manufacturing Chemists Assn.; R. O. Davis, of the Agriculture Dept.; Comdr. H. C. Shepherd, of the Coast Guard, and Mathew M. Braidech, of the National Board of Fire Underwriters.

Maj. Gen. Philip B. Fleming, Federal Works Administrator, said in appointing the study group that immediate consideration would be given to problems of shipping ammonium nitrate from port to port and to problems of fertilizer containers. A pamphlet soon will be issued by the committee, he said.

Buys Sodium Facilities

Washington

• • • **War-surplus sodium** bichromate production facilities built by the government to increase the capacity of the Martin Dennis Co. plant in Kearney, N. J., have been sold by WAA to the firm for $204,000 cash. The scrambled facilities, only partially completed by the government, were appraised at $317,600.

Canadian Steel Prices Up from $5 to $10 Per Ton; Ceilings Remain

Toronto

• • • Canadian steel prices have been advanced from $5 to $10 per ton, according to announcement by the Wartime Prices & Trade Board while the ceiling price on pig iron has been moved up a further $2.50 per ton, effective October 1st. Under the new price ceiling pig iron, base grade 2.5 silicon and under has been increased from $37 to $39.50 per gross ton delivered Toronto, while forging billets have advanced from $53 to $60 a gross ton.

Ceiling prices on the various steel items per net ton were increased as follows:

Carbon steel plate and wire rods, hot rolled	$7.00
Bars, hot rolled, carbon and alloy	5.00
Skelp	7.60
Black and galvanized sheets, hot rolled	7.00
Black and galvanized sheets, cold rolled	7.00
Vitreous enamelling sheets	7.00
Cold rolled drawing quality sheets	8.00
Vitreous enamelling, hot rolled sheets	10.00
Electrical sheets, hot rolled	10.00
Electrical sheets, cold rolled	10.00
Tin mill black sheets	10.00
Full finished sheets	10.00

The above advances in iron and steel prices follow the increase in steel scrap prices of $4.50 a ton reported in these columns recently.

Officials of W.T.P.B. attributed the increases to "accumulated costs" incurred since an average increase of $5.00 per ton was granted April 1, 1946. Since that time United States prices have been decontrolled and all raw materials from the U. S. have been increased "substantially" in price. Canadian raw materials also have been gradually decontrolled and steel companies have been required to absorb these increased costs. In addition a steel scrap increase of $4.50 a ton granted last week is reflected as a direct increase to the steel mills.

Dealing with the higher prices now in effect for steel, H. G. Hilton, president of the Steel Co. of Canada, stated that even with the increase permitted by relaxation of war time prices controls on steel the price of his company's products would be raised only 32 per cent above the prewar rates. That figure, he said, was still a much more moderate increase than that of most commodities and articles. In support of this contention he quoted reports from the Dominion Bureau of Statistics which showed such price jumps over the same period as 63 pct for wholesale prices in general; 85.4 pct for farm products; 75.5 pct for industrial materials; 70.1 pct for non-ferrous metals; 82.4 pct for raw and partially manufactured goods, and 86.6 pct for fully and chiefly manufactured goods.

Export Quotas Released By Commerce Department

Washington

• • • **The Office of** International Trade, Dept. of Commerce, on Oct. 6, announced total export quotas of steel mill products to be licensed during the fourth quarter of this year.

Included for the first time are all presently approved steel requirements of various special projects abroad of vital interest to the United States.

Export quotas follow:

COMMODITY	**Fourth Quarter Quotas —Short Tons**
Steel Sheet Bars & Tin Plate Bars	1,000
Steel Bars, CF 1" and under....	8,250
Concrete Reenforcing Bars	45,000
Other Steel Bars, Non-Alloy 1" and under	35,000
Wire Rods	12,800
Boiler Plate	111,600
Other Plate, Ex. Fabricated....	
Iron Sheets Galvanized..........	20,000[1]
Steel Sheets, Galvanized	
Steel Sheets, Black Ungalvanized	90,000
Iron Sheets, Black	
Iron & Steel Strip, Cold Rolled, Non-Alloy	7,500
Iron & Steel Strip, Not Rolled, Non-Alloy	15,500
Terneplate, Incl. Long Ternes....	2,000
Angles, Channels & Beams, 6" and under	33,000
Casing & Oil-line Pipe, Seamless.	40,000
Casing & Oil-line Pipe, Welded..	50,000
Seamless Black Pipe, Ex. Casing & Oil-line	2,500
Malleable Iron Pipe Fittings 150# and under	5,000
Couplings (etc.)	9,000
Cast-Iron Pressure Pipe	
Cast-Iron Pressure Pipe Fittings	
Welded Black Pipe, Steel	25,000[2]
Welded Black Pipe, Wrought Iron	1,500
Welded Galv. Pipe, Wrought Iron	
Welded Galv. Pipe, Steel	13,000
Iron & Steel Wire, Uncoated	21,000
Wire Nails, Other Nails	8,500

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[1] Licenses to be limited so that no more than 25% of quota will be in Gauges 22 and lighter.

[2] Licenses to be limited so that no more than 40% of the quota will be for butt and lap-weld pipe.

Coming Events

Oct. 9-10 **Porcelain Enamel Institute**, annual meeting, Cleveland.
Oct. 16-17 **National Conference on Industrial Hydraulics** (formerly Hydraulics Machinery Conference), annual meeting, Chicago.
Oct. 18-24 **National Metal Exposition**, Chicago.
Oct. 20-21 **Society of Automotive Engineers**, production meeting, Cleveland.
Oct. 20-22 **Iron and Steel and Institute of Metals Divisions of AIME**, annual fall meeting, Chicago.
Oct. 20-24 **American Society for Metals**, annual meeting, Chicago.
Oct. 20-24 **American Welding Society**, annual meeting, Chicago.
Oct. 20-24 **American Industrial Radium and X-Ray Society**, annual meeting, Chicago.
Oct. 30-Nov. 1 **American Society of Tool Engineers**, semiannual meeting, Boston.
Oct. 31 **Illinois Mining Institute**, annual meeting, Springfield, Ill.
Nov. 2-5 **National Tool and Die Manufacturers Assn.**, annual meeting, Philadelphia.
Nov. 6-7 **National Founders Assn.**, annual meeting, New York.
Nov. 6-7 **Society of Automotive Engineeres**, fuels and lubricants meeting, Tulsa, Okla.
Nov. 7-8 **Annual Conference on X-Ray and Electron Diffraction, Mellon Institute of Industrial Research**, Pittsburgh.

U. S. Ore Not Doomed Says J & L; Builds A New Beneficiation Lab

Pittsburgh

• • • **Jones & Laughlin** Steel Corp. has taken some more wind out of the sails of those who see a sudden end to America's ore supply. H. W. Graham, vice-president and director of technology for the steel producer, reports opening a new laboratory adjacent to large J & L ore holdings on the upper Michigan peninsula. It is fitted with facilities for investigation and pilot plant processing of these ores.

Mr. Graham announced that the company's ore research will be a division of the research and development laboratory in Pittsburgh, headed by Dr. H. K. Work, director of research. The ore laboratory, which is at Negaunee, Mich., is under the supervision of F. X. Tartaron.

An eight-room section of the new laboratory will be devoted to small scale research of a precise nature to provide background data on the ores. Another section of the building comprises a large shop where investigations can be carried out on a pilot plant scale. It contains modern equipment for crushing, grinding and beneficiating operations through to the final sintering or other agglomerating treatment of the ore.

The corporation stated that it would obviously not have built the laboratory if it were willing to accept the frequently made statement that this nation is rapidly approaching the end of its ore supply. There are, it added, millions of tons of ore in this country that require only minor adjustment in treatment to make excellent blast furnace material. It will be this new laboratory's function to explore these adjustments. Mr. Graham pointed out that establishment of this laboratory indicates a strong determination on the part of Jones & Laughlin Steel Corp. to work out a continuous supply of domestic ore for its future operations.

It is expected that most low grade ores will require relatively fine grinding as the preparatory step to beneficiation, hence concentrates will be too fine for direct use in the blast furnace. Sintering will therefore be required. Equipment to test the sintering characteristics of various ores has been transferred from the Pittsburgh laboratory. Further equipment is being assembled to develop other methods of agglomerating the fine ore.

Smaller Transformers Made by Allis-Chalmers

Milwaukee

• • • **Lighter and smaller** distribution transformers which are now being made by the Pittsburgh works of the Allis-Chalmers Mfg. Co., were made possible by the use of preferred orientation electrical core steel. The new design represents a 17 to 46 pct savings in weight with a corresponding reduction in size. The transformers are engineered to meet all the requirements of the EEI-NEMA joint committee on the standardization of distribution transformers from 1½ to 100 kva, 2400 through 15,000 v classes.

Some features of the new unit include spray bonderized steel tanks with machine welded seams to insure permanent protection against leaks. The high voltage pockets fabricated from a single piece of special deep drawing steel are permanently welded to the tank wall. The low voltage bushings mounted with a gasketed joint are held in compression by a pressed steel gasket ring and this ring can be easily removed at installation for replacement of such bushings, if necessary, without opening the transformer.

Other features include standard flat-slotted lugs on internal low voltage leads which allow quick change from series to parallel or vice versa.

50 YEARS AGO

THE IRON AGE, *October 7, 1897*

• "The American Tin Plate Co. and the workers' committee have reached the following wage agreement: For first class charcoal stacks, tin men shall receive $2.00 per day. Plate wheelers shall receive $1.75 per day, providing that 11 stacks constitute a day's work. Truckers, carriers, dusters and reckoners shall receive 13½¢ per hr or $1.35 per day."

• "A Comparison of Prices"

Pig Iron, Foundry No. 2, Philadelphia per gross ton	**$11.25**
Steel Billets, Pittsburgh per gross ton	**16.25**
Sheets, No. 27, Pittsburgh ¢ per lb	**1.95**
Copper, New York ¢ per lb	**11.25**
Lead, New York ¢ per lb	**4.32**
Tin, New York ¢ per lb.	**13.65**
Nickel, New York ¢ per lb	**33.50**

• "The largest steam power plant in the world will be erected by the Metropolitan Tractor Co. at 96th St. and 1st Ave., New York City. The five north and south and two cross town street railways are to be run by electric current furnished from this station, which is expected to have a capacity of 70,000 hp."

• **"The growth of the city of London continues at an extraordinary extent. Recent returns show that 1200 houses are being erected monthly."**

• "Carroll D. Wright, the well known statistician, in an article contributed to the Atlantic Monthly has analyzed the assertion that the rich are growing richer and the poor poorer. Mr. Wright states the fact in a nutshell when he says, 'To the investigator, the real statement should be, the rich are growing richer, many more people are growing rich, and the poor are growing better off.'"

Industrial Briefs . . .

• **Railroad Manual**—The 42nd annual edition of "Oliphant's Earning Power of Railroads" is being distributed by Jas. H. Oliphant & Co., 61 Broadway, New York, Stock Exchange Members. Tables, which enable comparative study of 92 railroads, provide data on capital structure, earnings, traffic, etc., with significant ratios computed.

• **New Plant**—Rockwell Engineering Co., 10126 S. Western Ave., Chicago, specializing in steel fabricating, forging, machining and welding are completing construction of their new plant on their 5 acre tract at 13500 S. Western Ave., Blue Island, Ill.

• **Purchases Company**—Wood Brothers, Inc., Des Moines, Iowa, farm equipment manufacturing company has been purchased by Dearborn Motors Corp., Detroit. Frank R. Pierce, president of Dearborn Motors, succeeds W. Harold Brenton as president of Wood Brothers. The present production rate of corn pickers is 18,000 per year.

• **Western Representatives**—Bliss & Laughlin, Inc. has announced the appointment of the Lawrence-Totten Co., as district sales representatives on the Pacific Coast, with offices in Los Angeles, San Francisco and Seattle.

• **More Springs**—The Turner Construction Co. has announced that it will build an additional $2 million industrial plant at Forestville, Conn., for the Wallace Barnes Div. of the Associated Spring Corp., of Bristol. It is expected to be ready for occupancy in about 18 months, and will handle the heavier types of work connected with spring manufacture.

• **Acquires Hemp Plant**—Walworth Foundries, Inc., Walworth, Wis., has purchased a government owned hemp plant at Darien, Wis., and will move its operations there.

• **Noll Plant Moves** — Noll Bros., Milwaukee, farm machinery specialties, will move its machinery and equipment to Grafton, Wis., as soon as its new enlarged factory site is completed.

• **Buys Canol Equipment** — Albert & Davidson Pipe Corp. of Brooklyn, and L. B. Foster Co., Pittsburgh, jointly have purchased the Canol Crude Oil Pipe Line and facilities. All equipment will be offered for resale in the near future.

• **Chicago Office** — W. G. Reichert Engineering Co., Newark, foundry consultants, has announced the opening of a Chicago office at 11357 Michigan Ave. J. H. Gougler is in charge of the Chicago office.

• **Modernization Program** — Two new manufacturing buildings will be erected as part of a modernization program for the West Pullman Works of the International Harvester Co. costing approximately $5 million. One of these buildings will house a modern bolt, nut and rivet manufacturing operation. The second will house a large automatic screw machine operation. A group of existing connecting buildings will be completely rehabilitated for use as plant offices. Construction is expected to start before the end of 1947, and the entire project is scheduled to be completed before the end of 1948.

• **Worldwide Distribution** — As an expanded service to overseas and Latin American offices of U. S. manufacturers and their distributors, Kelite Products, Inc., manufacturers of specialized industrial equipment, has recently set up distributing points at Panama City, San Salvador; La Ceiba, Honduras; San Jose, Costa Rica; Curacao, N. W. I.; Mexico City and at Sidney, Melbourne, Brisbane, Newcastle, and Adelaide, Australia.

University Takes Over Atomic Research Labs

Chicago

• • • **In referring** to the transfer of the operation of the Clinton research laboratories from the Monsanto Chemical Co.'s facilities to the University of Chicago, David E. Lilienthal, chairman of the United States Atomic Energy Commission, praised the outstanding performance Monsanto has rendered to the people of this country in managing the research facilities at Oak Ridge.

In a letter to Dr. Charles Allen Thomas, executive vice-president of the company, who was project director of the Clinton laboratories, Mr. Lilienthal expressed the commission's appreciation for the contribution made to the United States Atomic Energy program. "One of Monsanto's principal contributions," Mr. Lilienthal stated, "has been the development of successful production processes for radioisotopes."

Mr. Lilienthal said the commission fully understood the reason which led Monsanto to the decision that it could no longer manage the Oak Ridge and the rapidly expanding operations near Dayton. "Your relinquishing of the responsibility for the work at Clinton would, indeed, be a sad occasion if Monsanto were not remaining a member of the family of industrial contractors performing such an important service to the Atomic Energy Commission program," Mr. Lilienthal added.

Coal Wages Drop in July

Washington

• • • **Reflecting** the coal holiday, the month of July saw the basic steelworker's average work-week shortened by more than 2 hr and brought a decline of nearly $3 a week in wages. As a result, average weekly earnings for all workers in iron and steel and their products declined from the $55.17 in June to $53.58 in July.

Average decline in all manufacturing amounted to only 30¢ and at the end of July stood at $49.03 for a work-week of 39.8 hr. At the same time, the initial result of the new miners' contract was to boost bituminous wages from $1.48 per hr to $1.73.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

12,000 **Tons,** Memphis, Tenn., bridge, Joint Commission for States of Tennessee and Arkansas, to Harris Structural Steel Co., New York.
1200 **Tons,** West Pullman, Ill., building for International Harvester Co. to Allied Fabricaters Co.
600 **Tons,** Indianapolis, building for International Harvester Co. to Allied Fabricators Co.
400 **Tons,** Fort Wayne, Ind., highway bridge, Indiana State Highway Dept. to allied Fabricaters Co.
320 **Tons,** Passaic, N. J., manufacturing plant for Fosterman Woolen Co. to American Bridge Co., Pittsburgh, through Stone & Webster Engineering Corp., Boston, engineers.
250 **Tons,** Milwaukee, building for the Hot Point Div. of General Electric Co. to Austin Co., Cleveland.
215 **Tons,** Chicago, warehouse for Holleb & Co. through A. Epstein, contractor, to J. T. Ryerson & Son, Chicago.
200 **Tons,** Phoenix, Ariz., project 1932, U. S. Bureau of Reclamation to Allison Steel Mfg. Co., Phoenix.
175 **Tons,** Vineland, N. J., Bell Telephone Co., central office building, to Bethlehem Steel Co., Bethlehem.

• • • **Fabricated steel inquiries** this week included the following:

1700 **Tons,** Lancaster, Pa., Armstrong Cork Co., building, due Oct. 15.
350 **Tons,** Philadelphia, Gulf Refining Co., eight buildings, bids in.
175 **Tons,** Emmetsburg, Md., gymnasium building, Mount St. Mary's College, due Oct. 18.
150 **Tons,** Juniata County, Pa., bridge, Pennsylvania Dept. of Highways, bids in.

• • • **Reinforcing bar awards** this week included the following:

1500 **Tons,** Thermopolis, Mo., Boysen Dam and power house, Morrison Knudeson Co., Boise, Idaho, low bidder.
500 **Tons,** Cambridge, Mass., dormitory for Massachusetts Institute of Technology to unnamed company.
250 **Tons,** Edina, Minn., school building through Schumacher Co. to U. S. Steel Supply Co., Minneapolis.
100 **Tons,** Chicago, substructure North State St. viaduct, Thomas McQueen of Chicago, low bidder.

• • • **Reinforcing bar inquiries** this week included the following:

370 **Tons,** State of Wisconsin, state highway paving projects, bids close Oct. 21.
270 **Tons,** Champaign, Ill., national resources building for University of Illinois. Previously reported as 125 tons.

• • • **Railroad car awards** this week included the following:

Missouri & Pacific R.R. is asking for court approval to build 1200 to 1400 gondolas at the De Soto, Mo. shops starting in March or April of 1948. The Monon R.R. has ordered 100 50-ton auto box cars from Pressed Steel Car Co., Mt. Vernon, Ohio, 300 50-ton high side gondolas from Pullman Standard Car Mfg. Co. and 50 70-ton drop end gondolas from Greenville Steel Car Co. The Chesapeake & Ohio Ry. Co. has ordered 50 70-ton covered hoppers from Ralston Steel Car Co., 1000 50-ton gondolas from Pressed Steel Car Co., and 150 cabooses from American Car & Foundry Co. Seaboard Air Line R.R. has ordered 300 50-ton high side gondola cars and 100 50-ton low side gondola cars from American Car & Foundry. The Western Maryland Ry. Co. has placed an order with Bethlehem Steel Co. for 1000 55-ton hopper cars.

British Steel Prices Go Up From 5 to 6 Pct

London

• • • **As from Oct. 1, steel** prices in Britain have been increased by from 5 to 6 pct due to the increases which have taken place in railway freight charges and in prices of coal and coke. Steel billets are increased by $3.00 per long ton, heavy steel products by $3.50, re-rolled products by $4.20 and steel sheets by $4.70.

Hematite pig-iron is raised by from $2.20 to $3.30 per ton according to delivery point, foundry pig-iron by $3.60 and blast-furnace ferromanganese by $3.40. Alloy steel is up by $3.00 on billets, $4.70 on black bars and $6.80 on bright bars. Wire rods are $4.00 per ton dearer. Heavy rails are $3.20 up and light rails $4.20. Tinplate prices have been raised by 17¢ a box of 108 lb.

Representative prices delivered to consumers' works per long ton now are: Basic pig-iron for steelmaking, $34.90; hematite, $38.00 to $41.70; foundry iron, $37.65 in the Midlands and $37.95 in the North; blast-furnace ferromanganese, $83.40; soft untested steel billets for re-rolling, $54.50; tinplate and sheet bars, $52.50; heavy joists and sections, $69.60; ship plates, $72.60; boiler plates, $76.10 to $77.10; heavy rails, $65.60; small bars, $39.80; small sections, $77.80; strip, $82.80; black sheets, $100.20; galvanized corrugated sheets, $127.70, and tinplate, $7.25 per ton basis box.

Bailey Named National President of ASME

New York

• • • **The election of** E. G. Bailey, vice-president of The Babcock & Wilcox Co., New York, as the next national president of The American Society of Mechanical Engineers, has been announced. Four regional vice-presidents and three directors-at-large also were named. The new officers will be assumed at the end of the 1947 annual meetings, to be held in Atlantic City Dec. 1-5.

Mr. Bailey, who succeeds Eugene W. O'Brien of Atlanta as president of the ASME, is noted as an authority on fuels, combustion and power developments. The Babcock & Wilcox Co., in which he holds office, manufactures steam generating equipment. Mr. Bailey is an inventor in the combustion field, with more than 100 U. S. patents. Other officers elected are: Regional vice-presidents — Frank M. Gunby, associate of Charles T. Main, Inc., Boston; Paul B. Eaton, head of the mechanical engineering department of Lafayette College, Easton, Pa.; Thomas E. Purcell, general superintendent of power stations, Duquesne Light Co., Pittsburgh; J. Calvin Brown, head of the engineering firm of J. Calvin Brown, Los Angeles.

Continues Current Prices

Hamilton, Ohio

• • • **Hamilton Foundry** & Machine Co. will continue current prices now in effect for shipments up to and including Dec. 31, 1947, according to a letter from Peter E. Rentschler, company president and treasurer, mailed to the trade Sept. 30.

Mr. Rentschler pointed out in his letter that Hamilton Machine & Foundry Co. made a very careful review of costs and selling prices around the first of the year and discovered they were no longer in reasonable relationship to each other.

Crowds Saw Chicago Show

Chicago

• • • **By Sept. 24,** 12,000 visitors had attended the Production and Machine Tool Show held at the Amphitheatre in Chicago. It is estimated that when the gates closed Sept. 26, around 18,000 persons had inspected the 62 exhibits which occupied 60,000 sq ft of floor space.

Exhibitors were enthusiastic over the results of the show and sales of the different types of machinery on exhibit have exceeded expectations.

Canadian Steel Production and Shipments

Toronto

• • • Canadian production of primary iron and steel shapes in July totaled 228,844 net tons, as compared with 253,869 tons in June and 127,575 tons in July, 1946. For July last year Canadian steel productions was sharply reduced as a result of the strikes that affected the three big basic steel producers. Output for the month under review included 220,044 tons of carbon steel shapes and 8800 tons of alloy steel shapes. In the production figures for July are included 57,258 tons shipped to producers own plants or to other plants within the primary industry for further processing.

Shipments of primary iron and steel shapes in June amounted to 167,498 net tons and included 159,285 tons of carbon steel shapes and 8213 tons of alloy steel shapes; for June, shipments totaled 188,655 tons, including 179,709 tons of carbon steel shapes and 8946 tons of alloy steel shapes; and for July 1946, shipments amounted to 101,799 tons, including 98,047 tons of carbon steel shapes and 3752 tons of alloy steel shapes. The above figures, which show iron and steel shapes made for sale do not include deliveries for further processing.

For the 7 months ending with July, production of primary iron and steel shapes totaled 1,850,051 net tons, while shipments for sale amounted to 1,398,279 net tons, and deliveries for producers' interchange amounted to 464,254 net tons. For the corresponding period last year production of primary iron and steel shapes amounted to 1,579,282 net tons and shipments for sale, 1,288,541 tons and producers' interchange, 299,494 tons.

The following table shows production and shipments for sale of primary iron and steel shapes for the month of July in net tons:

July 1947	Carbon Steel		Alloy Steel	
	Made	Shipped	Made	Shipped
Billets, etc., for forging	6,716	4,176	495	616
Other semifinished shapes, not for rerolling by makers	39,084	9,867	452	.....
Structural shapes and piling	8,810	7,049	.....	.....
Plates	14,759	14,174	.....	.....
Rails	15,141	14,357	.....	.....
Tie plates and track material—				
Splice bars	932	1,037	.....	.....
Tie plates	3,108	2,612	.....	.....
Spikes	955	1,002	.....	.....
Tool steel	33	153	180	241
Concrete reinforcing bars	9,329	6,828	.....	.....
Hot-rolled bars for cold finishing	659	....	.....	.....
Other hot-rolled bars	28,941	22,361	6,039	5,726
Pipes and tubes	10,343	10,733	.....	.....
Wire rods	21,554	16,844	12	12
Hot-rolled black sheets	20,537	16,332	.....	.....
Cold reduced black sheets	1,740	1,740	.....	.....
Galvanized sheets	7,186	7,264	.....	.....
Steel castings—Made by ingot makers	1,506	1,380	47	21
Made in other foundries	2,944	2,750	1,395	1,429
All other shapes, including tinplate, tin mill, black plate, cold-finished bars and strips, etc.	25,767	18,626	180	168
Total	220,044	159,285	8,800	8,213

Producers' shipments of primary iron and steel shapes subdivided according to principal consuming industries for the month of July, in net tons, follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries	5,732	3,912
Agricultural, including farm machinery	4,549	29
Building construction	19,151	280
Containers industry	14,249	3
Machinery and tools	10,824	440
Merchant trade products	18,629	179
Mining, lumbering, etc.	4,418	694
National defense	81	7
Pressing, forming and stamping	8,100	23
Public works and utilities	1,788	43
Railway operating	17,726	258
Railway cars and locomotives	12,525	30
Shipbuilding	2,978	123
Miscellaneous and unclassified	1,249	129
Wholesalers and warehouses	22,156	103
Direct export (1) to British Empire	10,203	70
(2) to Other Countries	4,927	1,890
Total Shipped for Sale	159,285	8,213

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AISI Indicates Steel Shipments Will Be One Third More Than in '46

New York

• • • **Steel shipments which** will be received by most consuming industries this year will be almost one third larger than their 1946 tonnages, according to an analysis by the American Iron & Steel Institute of preliminary steel distribution reports for the first half of 1947. This is based upon the assumption that the rate of finished steel shipments in the first half of 1947 will be maintained during the balance of 1947, resulting in the establishment of a new peacetime peak at 62 million net tons.

On the same basis, first half figures indicate that this year wholesalers and distributors of steel will get 1 million tons more finished steel than they were shipped in 1946; the automotive industry should get 2.5 million more tons than in 1946; the railroads about 1.2 million tons more; the oil and gas drilling industry would receive more than double its 1946 shipments or about 550,000 tons over direct shipments to this group in 1946; while the construction industry will get about 1.3 million tons more than in 1946.

Wholesalers and distributors who serve small business firms were the leading recipients of steel shipments during the 1947 first half, getting 16.8 pct of the total or 5,235,554 net tons. The automotive industry received 14.6 pct of first half shipments or 4,564,694 net tons, which compared with 13.4 pct or 6,557,199 net tons for the full year 1946.

Rail transportation accounted for 7.9 pct of total shipments, which was equivalent to 2,470,482 net tons, or almost two thirds the total tonnage received in 1946. First half shipments directly to the oil and gas drilling industry totaled 439,463 net tons, as compared with 316,366 net tons during the entire year 1946. First half 1947 shipments to distributors for ultimate use by the oil and gas industry totaled 477,166 net tons, while another 528,924 net tons were shipped for construction in the oil and gas industry; full year 1946 comparisons are 874,024 net tons and 820,070 net tons, respectively.

First half shipments for con-

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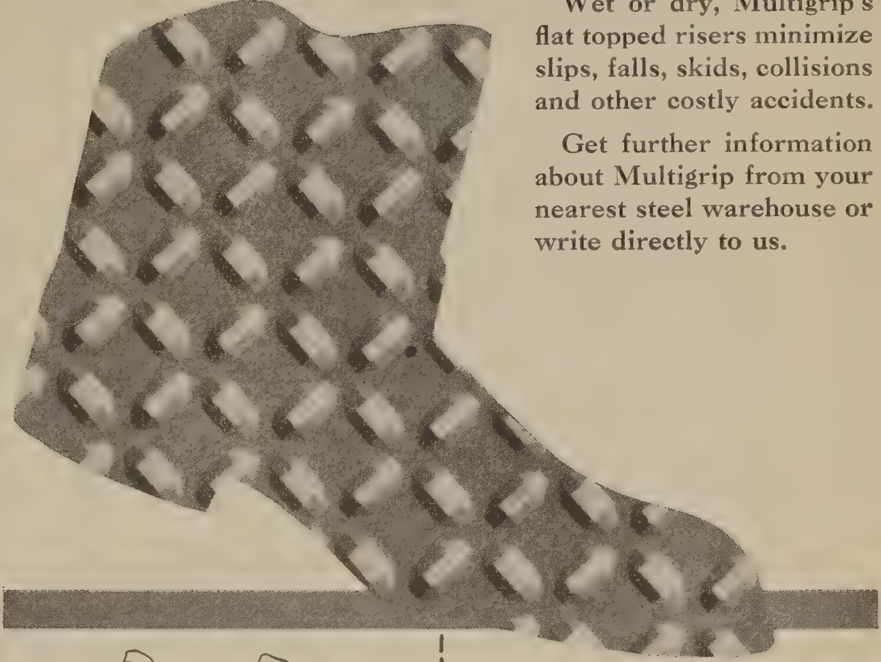

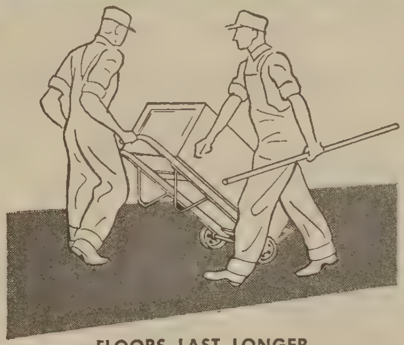

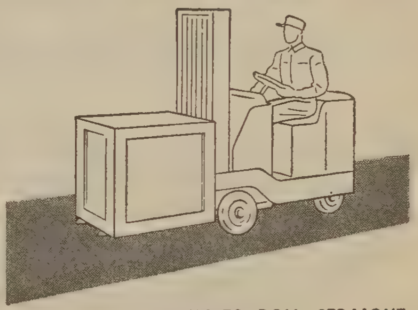

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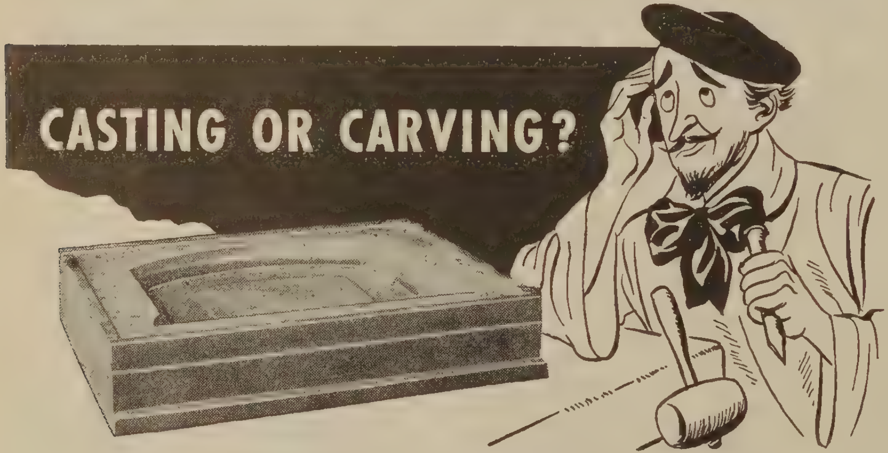
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Strenes Metal DRAWING AND FORMING DIES

struction purposes totaled 3,035 337 net tons as compared wit 4,767,703 net tons for the full yea 1946; for converters and proces sors 2,488,512 net tons v. 3,794,39 for 1946; containers 2,459,085 ne tons v. 4,255,287 net tons in 1946 machinery and tools 1,637,010 ne tons v. 2,415,517 net tons in 1946 electrical machinery 798,733 ne tons v. 1,154,506 net tons for 1946 contractors' products 1,128,253 ne tons v. 1,618,739 net tons in 1946 appliances, utensils and cutlery 774,655 net tons v. 1,227,154 i 1946; other domestic and commer cial equipment 845,452 net tons v 1,398,055 net tons.

Unclassified shipments durin the first half totaled 2,241,325 ne tons, and if specific data wer available on the distribution o this tonnage, then actual ship ments to most industries would b even higher than the detailed ton nages indicate. Direct exports b the industry during the 1947 firs half totaled 2,086,260 net tons, a compared with 3,026,771 net ton during the full year of 1946.

OIT Drives Against Illegal Trafficking In Export License

Washington

• • • **A drive against** illegal traf ficking in export licenses was initi ated by the Commerce Dept's Office of International Trade las week. OIT announced it had hire additional investigators to look int violations of export regulations.

Exporters currently are require to confine use of licenses to shipments against orders received prio to issuance of licenses. New license must be obtained for orders subsequently received. Advertising cop which solicits orders and implie that necessary licenses have bee obtained are improper, OIT pointe out. Similarly, it is improper t purchase an export license fo goods not yet purchased.

OIT reminded the business community that violations of expor control regulations are punishabl by fine and imprisonment and als by denial of the privilege of applying for licenses. Violators also ma be denied the privilege of applying for export licenses for a state period of time and may be prohibited from exporting those item which are not subject to individua licensing.

AISE Elects Officers At Pittsburgh Meeting

ittsburgh

• • • **A. J. "Andy" Fisher,** fuel ngineer of the Bethlehem Steel Co. Sparrows Point plant, was elected president of the Assn. of Iron & Steel Engineers for the calendar year 1948.

A. J. Fisher

A native of Montana, and a mechanical engineering graduate of the college of engineering of the University of Colorado, Mr. Fisher started as an assistant master mechanic in 1924 at the sheet and tin mill division of the Maryland plant of the Bethlehem Steel Co. He has worked continuously for the company and in 1929 was made fuel engineer.

Mr. Fisher has been an active member of the association since 937, and is the author of a number of technical papers.

Other men elected officers of the AISE are C. H. Williams, chief engineer, Pittsburgh district, Carnegie-Illinois Steel Corp., who becomes first vice-president; and A. S. Glossbrenner, assistant vice-president of operations, Youngstown district, Youngstown Sheet & Tube Co., who was elected second vice-president. John F. Black, general superintendent, Colorado Fuel & Iron Corp., Wickwire-Spencer Steel Div., was elected treasurer; and I. N. Tull, electrical superintendent, Republic Steel Corp., was elected secretary.

To Visit Germany

Washington

• • • **Franklin Berwin and Jacob L. Holtzman** of Colorado Fuel & Iron Corp.; Joseph and Dorothy Block of Steelmasters, Inc.; William M. Cameron of Continental Can Co.; Paul Ludwig Weiden of Western Steel Corp.; and, Arthur W. Mall of Mall Tool Co. are among business representatives granted permits by the Army to visit the United States and British occupied zones of Germany during October.

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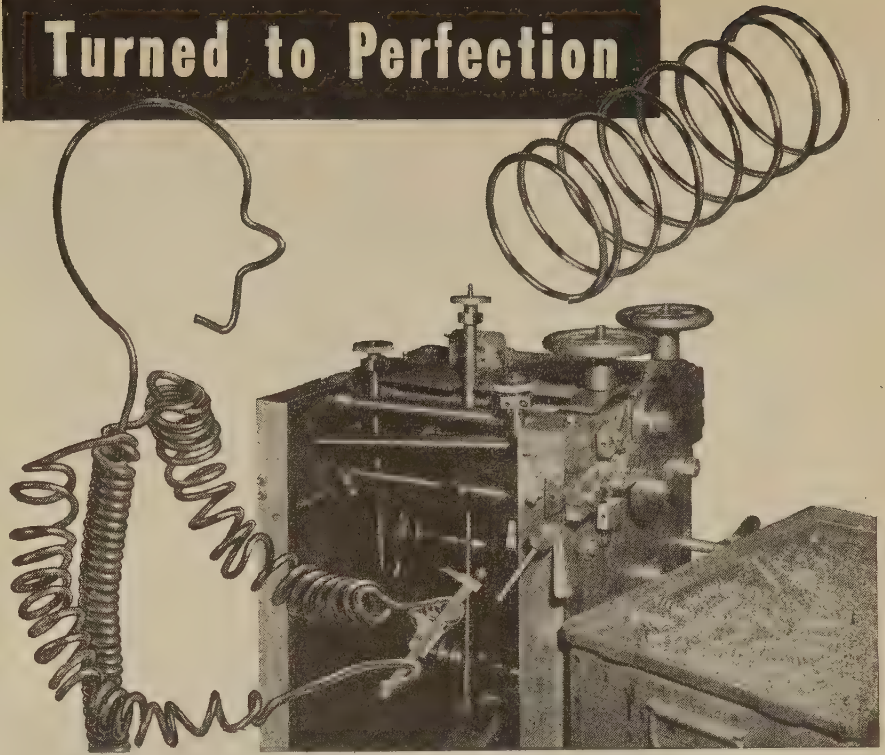

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C. R. Cox Calls For Change in Handling of Depreciation Reserves

Pittsburgh

• • • **Present methods** of depreciation accounting, as required by taxing authorities, threaten adequate replacement of worn industrial facilities, C. R. Cox, president of U. S. Steel's Carnegie-Illinois Steel Corp. told members of the Assn. of Iron & Steel Engineers at their annual dinner meeting here on Sept. 24.

Pointing out that between 1901 and 1946 dollar costs of steel plant construction have increased five times, Mr. Cox said allowances for depreciation must eventually be based on "replacement cost" rather than "original cost." In addition to the disparity between 1901 and 1946, he said costs in the latter year were four times those of 1915—double the average cost between 1919 and 1932—and 100 pct higher than in 1939.

Recognizing that there will be adjustments in some of these factors as time goes by, and future purchasing power of the dollar will be subject both to plus and minus influence, he added "continued long-term increase in costs and prices is apparent."

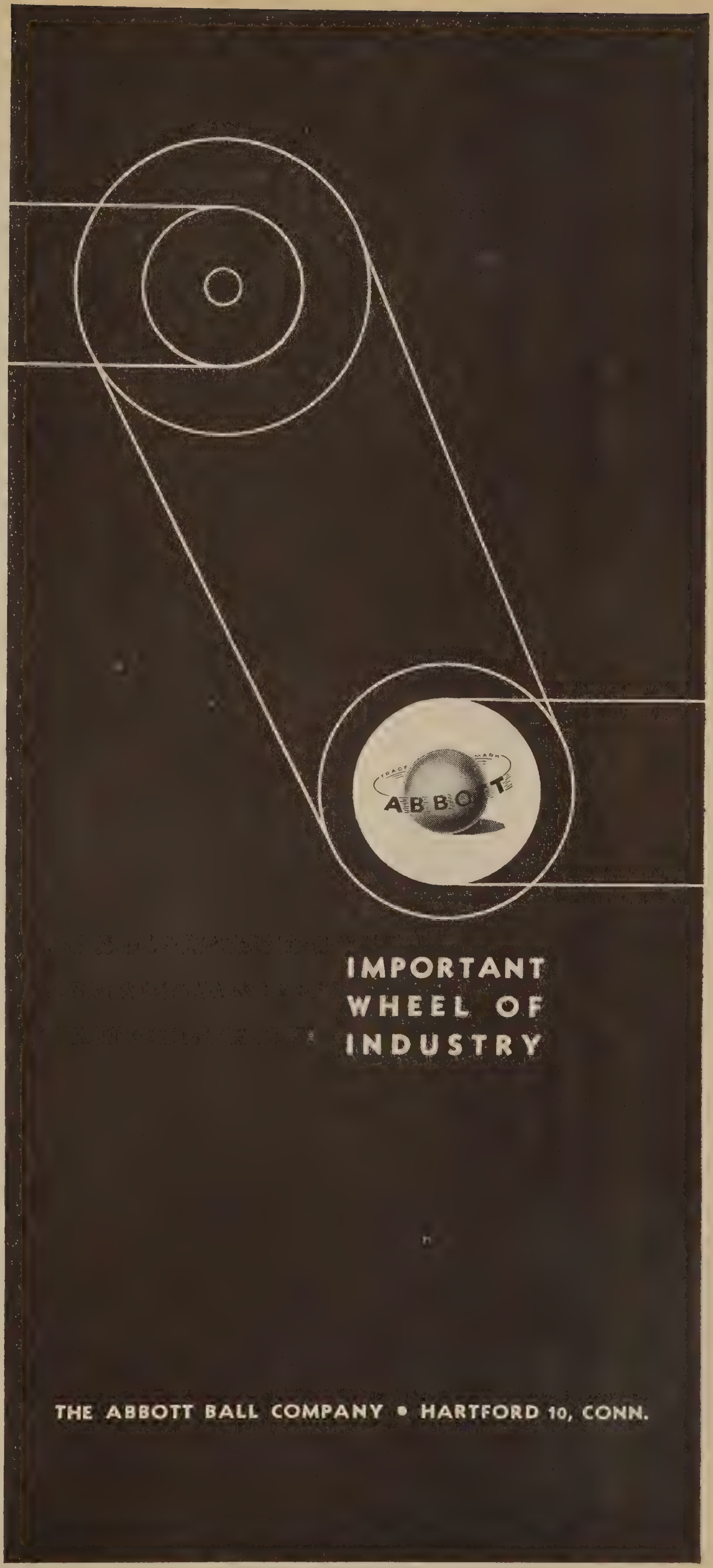
Mr. Cox said that heavy industries such as steel suffer most severely the penalties for inadequate reserves to meet advancing dollar prices, adding: "Most of steel's capital investment is in long-lived facilities in contrast to industries whose facilities are quickly expendable, and therefore chargeable to current operating costs or to capital investments depreciable over short periods. The latter class of industries includes motion picture production, trucking and taxicab service, and many others subject to sudden change in customer requirements or rapid technological advances.

"This continuing change in the value of the dollar, coupled with the legal fiction that there is no such change, places productive enterprise in an awkward position. The federal tax nominally imposed only on income becomes in effect an actual assessment levied on capital investment. This levy, entirely beyond the original intent of the law, comes about through the failure to provide adequate reserves for the depreciation of capital assets.

"The Bureau of Internal Revenue has recognized no material change in its concept of depreciation in the 34 years since the beginning of constitutional taxation of income by the U. S. Government. But conditions have changed radically. The year 1913 followed a long period of relatively stable prices. Within a few years, however, the Federal Reserve System was established, World War I was fought, and the upward trend of prices and the corresponding downward trend in the value of the currency here definitely established. This had the effect of changing the tax on income to a levy on capital, disguised though it might be."

Examining the effect of inadequate reserves for depreciation, Mr. Cox said that to balance the statement of financial condition, an understatement of this liability means a corresponding overstatement of surplus. Similarly on the income statement, he said, too little annual depreciation means the understatement of producing costs and the overstatement of profits. . . . "Under the present federal law," Mr. Cox said, "this fictitious profit is taxable in real money just as if it had actually been earned. Another penalty which follows such an exaggerated report of earnings is an erroneous public opinion that the business is highly profitable and that justifiable demands may be made for lower prices and higher wages."

Calling for corrective measures, he proposed: (1) Convey correct information on earnings and financial condition to all concerned as, for example, by including in the annual report an explicit evaluation of the depreciation of facilities in current dollars and the deficiency resulting from the expression of this depreciation in terms of original dollar cost. The effect of the deficiency should be carried through the statements of earnings and financial condition to make clear even to a casual reader the true earnings and actual additions to productive investment; and (2) work for a revision of law and regulations to tax only true earnings and not capital as income.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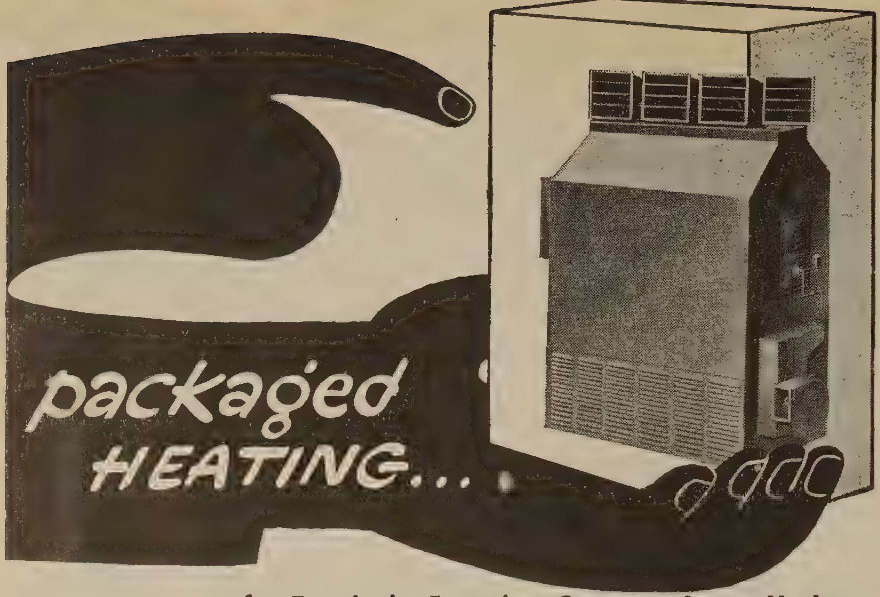

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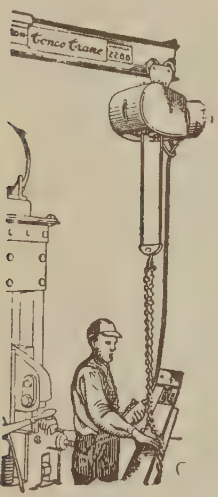

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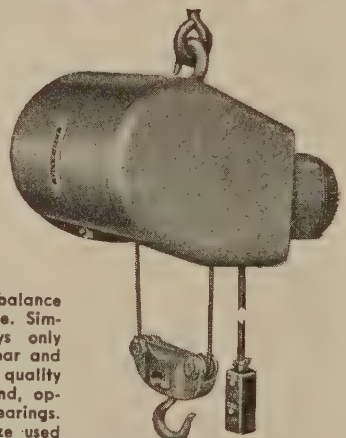

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Senator Criticizes Steel Industry For Bowing Before Lewis

Washington

• • • **Charges that the** steel industry is "in default of obtaining more reasonable terms" in the Lewis coal settlement last summer lay before top officials this week.

Senator Flanders, R., Vt., speaking before the U. S. Chamber of Commerce Economic Institute, declared that the two largest "disasters" of the summer contributing to further inflation were the heavy floods which cut food production and the signing of the coal pact.

Except for Mr. Lewis' "oft-repeated time-consuming tactics," there was "little visible appearance of resistance or of real negotiation," Mr. Flanders charged. He pointed to industry statements issued in July declaring that the latest price increases were the result of cost increases of the first 6 months and not of boosts in miners' pay. "Are we to expect a further round of price increases as a result of the wage cycle that the coal settlement precipitated?" the Vermonter demanded.

"This negotiation is not a private matter," he told the Chamber's economists. "It is a matter of public concern and must be defended from the viewpoint of public welfare if it is to be justified at all. That this is so, is due to the great size and basic influences of the coal and steel industries involved, and to the inflationary contagion in wages and prices endemic in this long-continued period of virtually full employment."

"The industry might have found vigorously for less extreme terms," Senator Flanders stated. "Better yet, it might have discussed the matter with John Lewis on broad grounds of public policy, affecting miners' interests as well as those of their employers. In default of obtaining more reasonable terms by these means, the problem might have been brought before the bar of public opinion, so that its true nature as a question of public policy was revealed. It could have been submitted to arbitration."

Senator Flanders likened the signing of the coal agreement to the 1938 Munich Pact. "In both cases peace seemed to be of such supreme importance that almost everything else was sacrificed for it. Peace has been purchased, but at too high a price to be repeated."

Senator Flanders is chairman of the Eastern Area Subcommittee of the Joint Committee on the Economic Report. The full joint committee, headed by Senator Taft, R., Ohio, is making a study of price trends in every section of the nation.

Iron, Steel Dividends Paid Increase 26 Pct

Washington

• • • **Publicly reported** dividends paid out by iron and steel corporations during August totaled $12 million, to bring the total for the 3-month period of June-July-August to $66.6 million, an increase of 26 pct over the same period of last year.

This amount represents about 60 pct of all dividends paid, the Dept. of Commerce says. The total reported by all corporations for August amounted to $179 million, representing an 8 pct increase over August 1946.

For the 3 months ended Aug. 31, reported payments by mining corporations were up 49 pct over the same period last year; textile and leather, 51 pct; oil refining, 30 pct; nonferrous metals, 28 pct; and, food, beverage and tobacco companies, 25 pct.

Coal Stocks Decline

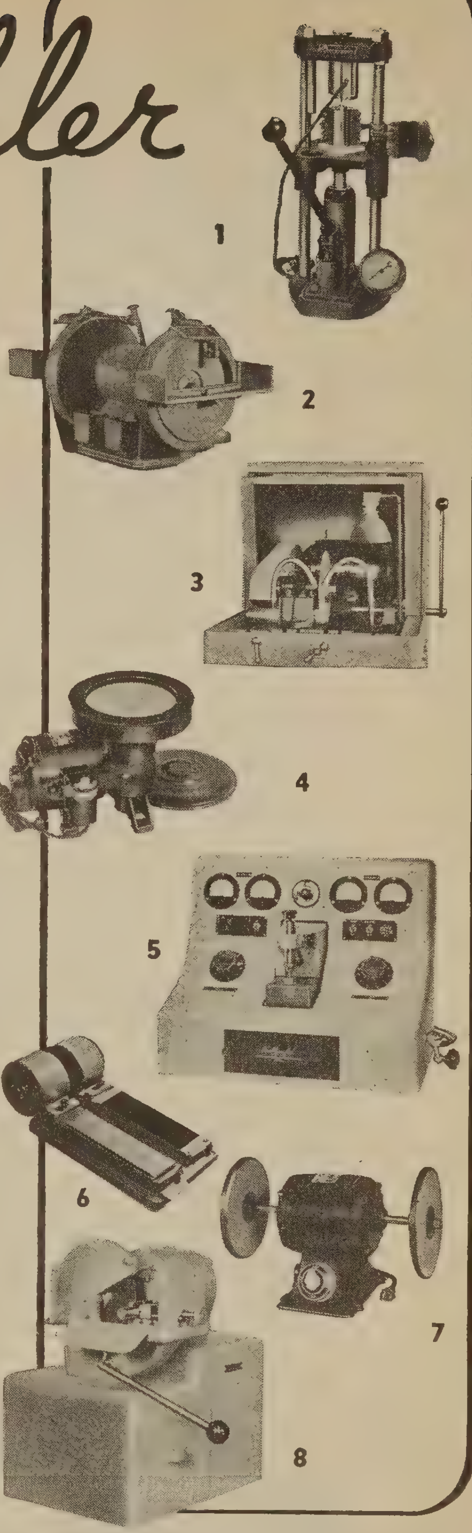
Washington

• • • **With production of** electric energy at a new all-time high, utility companies find their stocks of coal declining, the Federal Power Commission reveals. While stocks are about 23 pct higher than a year ago, July peak production reduced the utility coal supply nearly 6 pct.

Power plants, as of August 1, had stocks of coal on hand equivalent to 77 days of operation at the July rate, compared with 84 days in June and 73 days' supply a year ago, it was estimated.

Fuel oil stocks, as of August 1, constituted a 52-day supply.

Continuing increased production for the eleventh consecutive month, July electric energy production was estimated at 20.7 billion khwr. Present capacity is about 50 billion kwhr.



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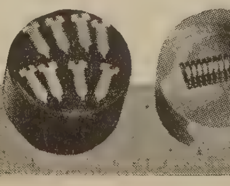

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Gas Turbine Boat Gets First Tryout By British Navy

London

• • • **The first boat** to be powered by a gas turbine has been delivered to the British Navy, and preliminary trials are proceeding satisfactorily. The boat, which during the war was on "ball-bearing" runs to the Skaggerak, is a 110-ft. triple-screw craft, the central shaft being driven by a gas turbine in the place of one of the three 1250 hp gasoline engines which formerly powered her. The turbine under trial has been developed for the Admiralty by Metropolitan-Vickers Co., Ltd., of Manchester, England.

For a number of years, the leading engineering nations have been interested in the development and marine application of the gas turbine. The essentially rotary motion of these power units obviates vibration and certain other inherent disadvantages of the "push-pull" motion of the conventional reciprocating internal combustion engine. Thus the engine combines the advantages of the smooth running steam turbine with economy in weight and space.

It was learned only on September 3 at the World Power Conference at the Hague that the French have trial gas turbines under construction or on the drawing boards for proposed marine application with their merchant navy. From the viewpoint of both British and French national economies, the possibility of using liquid fuels, preferably heavy liquids, is of primary interest in the development of this type of power.

This British marine unit comprises an axial flow compressor, which supplies air under pressure to the combustion chamber. Diesel fuel is burned and the gases are expanded through a 2-stage turbine. A 4-stage turbine is coupled to the propeller shaft through gears. The output is nominally rated at 2500 shaft horsepower. The installation being an experimental one, it is not intended to create speed records.

The metallurgical layout of the turbine is as follows: The axial-flow compressor has aerofoil section blades of aluminum alloy, mounted in axial serrated slots in a forged aluminum alloy drum.

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The stator casing is also of this type of alloy. The sheet-metal portion of the combustion chamber is of "Immaculate 5" stainless steel.

The turbine driving the compressor is of the two-stage type with a disc of molybdenum-vanadium steel carrying moving blading of "Nimonic 80" alloy. This steel is manufactured in England by Henry Wiggin & Co., Ltd. The power turbine, which rotates independently of the compressor turbine, has four stages with both fixed and moving blades of molybdenum-vanadium steel, mounted in a drum of the same steel. The fixed blades are dovetailed into circumferential slots machined in the stator casing made of forged mild steel.

One of the engineers was asked if trouble was expected from salt-laden spray entering the air inlet, and apparently tests have already been carried out simulating salt-spray conditions. It was found that there was a certain falling off in efficiency due to salt building up on the edges of the compressor blades. The salt present in the hot blast driving the "Nimonic 80" blades may have some corrosive effect, but the engineers in charge did not seem to think so.

The British Admiralty is already planning larger gas-turbine machinery for installation in a vessel of the escort type. This further project has been designed as a marine propulsion unit from the start, and it is predicted that its durability and efficiency will be greater than those of the engine now under trial.

Gas turbines also seem to have a bright future in industry. W. Karrer, of the Ateliers de Construction Oerlikon, Switzerland, pointed out at the Hague Conference that they can be used as a means of securing additional output of power. In the form of an air turbine, they can be embodied into steam-power plants, and like the back-pressure steam turbine, they can be used to obtain extra power with a low fuel consumption. It was learned at the recent British Iron and Steel Institute meeting in Switzerland that four Swiss firms are now producing medium-size gas turbines to order, and that Brown-Boveri are building a gas turbine for blast-furnace work. The bulk of special steels used in Europe for gas turbines is made in England.

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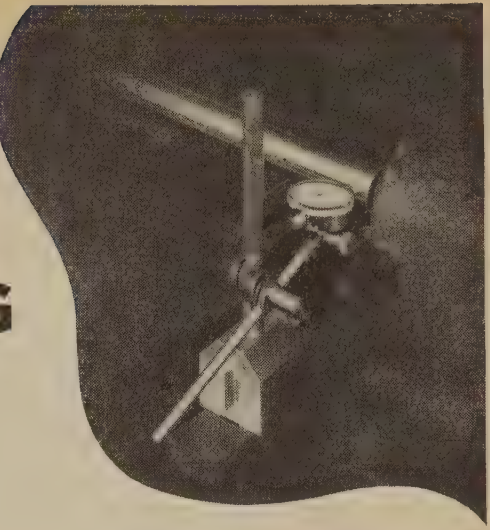

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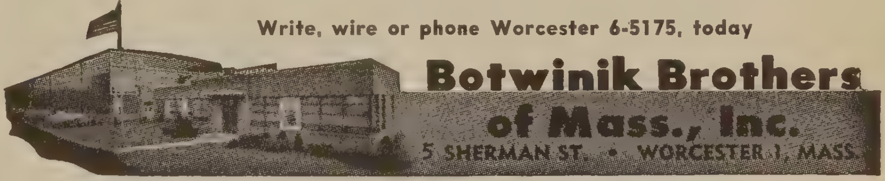

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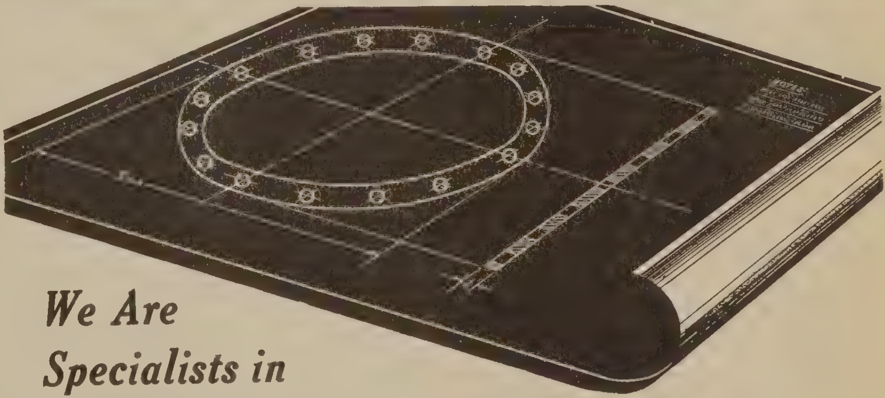

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Machine Tool Show Reported Stimulating Sales Volume for 1947

Expect Sales Will Total $300 Million This Year; 50 Pct Above Prewar Years

• • • **Sales volume at** the 1947 Machine Tool Show surpassed the expectations of most segments of the industry, according to reports percolating through the trade.

One of the major producers of turret lathes, as a case in point, sold about $750,000 worth of equipment at the show and about $1,500,000 since the end of festivities in Chicago. None of this equipment was sold before it left the factory for the Dodge-Chicago plant, as was the case with some of the machines shown by a few producers.

It is probably a very good thing for the industry that the show proved to be a shot in the arm for customers, for August business was down considerably, with shipments of $16,400,000 compared with July's $16,800,000; new firm orders of $16 million compared with July's $22 million (and this is where it really hurt); unfilled orders totaling about $122 million, or about 6 or 7 months' work at the present rate of production.

These and other factors probably inspired H. H. Pease, president of National Machine Tool Builders' Assn. and the New Britain Machine Co., to point out that a number of buyers requested that machines on exhibit be sent them directly from the show.

"A tremendous number of sales inquiries have been initiated, and many of these will reach the point of actual purchase within a matter of weeks and months after the closing of the show, when the engineers of the buying companies and those of the machine tool companies have an opportunity to analyze requirements for industries in general," Mr. Pease said.

"It appears certain that final quarter sales of the industry will exceed those of any previous quarter this year, due to the stimulus of the show, and it likewise appears certain that machine tool sales this year will total $300 million, which is 50 pct better than any prewar year. The export situation is very uncertain—but there is a tremendous demand abroad for these machines, which can mean the industrial recovery of all war-ravaged countries, and economic stability in this country."

In Detroit preparations for model change-over have been speeded up substantially in recent weeks. With only three independent producers already in the field with postwar cars, a substantial amount of tooling work remains to be done.

A private survey conducted recently by the Automotive Tool & Die Manufacturers Assn. indicates that the automobile industry is currently spending $7 million per month in independent tool and die shops for new tools, jigs and fixtures. This is in addition to power-driven metalworking machinery produced by the machine tool builders who are expected to sell more than $100 million worth of new machine tools to the auto industry this year.

Informed sources report that tooling for the new Buick transmission is going forward at a pace that would indicate the first production of the new transmission will occur in December 1947. This has been interpreted to mean that the new transmission may be available to the public very early in 1948.

In Cincinnati, several major segments of the industry report that inquiries are up sharply, and if only a portion result in orders, the shops will be very busy. Not a few of the inquiries stem from the some 1400 foreign visitors that were registered at the show. According to Swan Bergstrom, Cincinnati Milling Machine Co., and chairman of the Machine Tool Show committee, three factors were instrumental in stimulating interest in the latest products of the machine tool industry: a desire to save work effort and lessen fatigue on operators through automatic operations; to machine more pieces in less time, thus reducing operating costs; and a desire to improve accuracy.

In Washington, 13 outstanding manufacturers and users of machine tools have accepted invitations to become members of the Machine Tool Industry Advisory Task Committee of the Army-Navy Munitions Board. The MTIAT committee will assist the Munitions Board in formulating plans concerning the machine tool industry relative to industrial mobilization planning.

Committee members are John A. Bradner, president, Lees-Bradner Co., Cleveland; G. R. Burt, chairman of the board, Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.; Eugene C. Clark, Chambersburg Engineering Co., Chambersburg, Pa.; Henry J. Cupper, General Motors Corp., Detroit; C. W. Fuller, General Electric Co. Mfg. Div., Schenectady; Fred V. Geier, president, Cincinnati Milling Machine Co., Cincinnati; Lee Hammond, Hammond Machine Builders, Kalamazoo, Mich.

Also H. A. Ingle, president, Consolidated Machine Tool Co., Rochester; H. E. Lasker, factory superintendent, Republic Aviation Corp., Farmingdale, N. Y.; William J. Pearson, construction engineering department, Bethlehem Steel Co., Bethlehem; J. H. Schreiber, chairman of the board, General Engineering & Mfg. Co., St. Louis; Charles J. Stilwell, president, Warner & Swasey Co., Cleveland, and J. L. Trecker, president, Kearney-Trecker Corp., Milwaukee.

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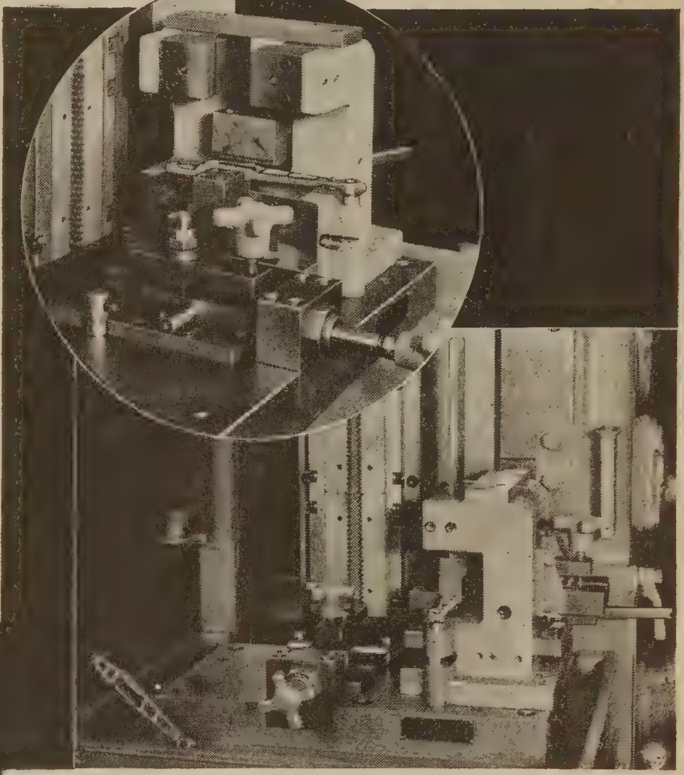
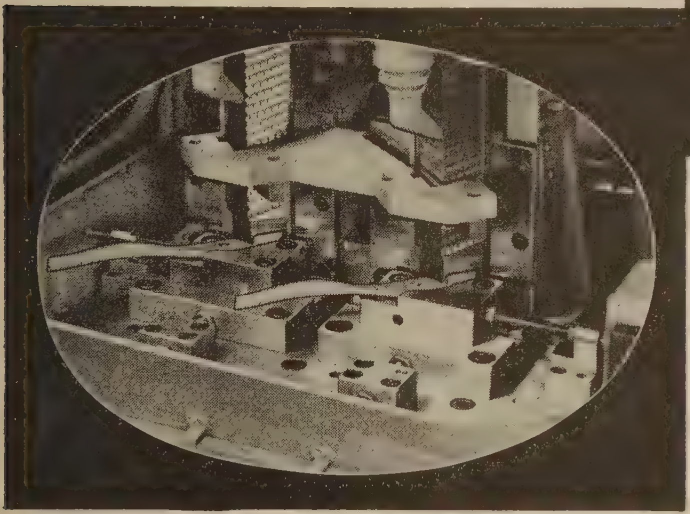


(Above)—A simplified manually operated two station fixture to produce two sewing machine parts to close limits. A cast iron Slide Block is straddle broached at the left hand station; a slot in a malleable iron Main Connection part is surface broached at the right hand station. Parts are clamped manually, and floating jacks, also manually-operated, are provided to prevent springing of the Main Connection part. Exceptionally fine finish is obtained on both parts which interlock in the final sewing machine mechanism.



(Above)—This *American* designed fixture for broaching the jaw teeth of plier halves consists of two work stations. Separate work locators are supplied for each type of plier half. Parts are automatically clamped and unclamped by means of an air cylinder. Location is taken from the previously drilled hole in the forged steel part. Production of plier halves is increased considerably over the previous machining method.

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NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Demand for copper** continues to grow stronger to the point where some observers predict a long continued short supply position. Wire mills are ordering heavily and reports indicate that brass mill demand in November will be slightly above October. South American copper is being brought into this country to supply the deficiency between domestic supply and demand. Foreign inquiry for copper has been poor in recent months but it is understood that there has been a recent improvement in the volume of foreign inquiries. Scrap copper and brass prices are holding at low levels relative to virgin copper because, according to observers, of the holding back of scrap when the market was tight in the expectation of higher prices. Later the refineries were flooded with scrap beyond their capacity to absorb it. The price spread in ingot metals continues this week and there are indications that this spread may be expected to continue for some time.

A return to the former practice of firm prices for brass mill products deliverable within 60 days has been announced by the Chase Brass and Copper Co. All but one of the copper producers have been operating on the basis of firm prices for delivery within 30 days, and this is true also of lead and zinc producers. This practice assures buyers of the prices at which metals and brass mill products are deliverable but does not permit them to obtain the advantage of any market decline which might take place. However the possibility of decline in any of these metals is not likely at an early date.

•

Zinc

• • • **The zinc market** is definitely stronger as indicated to producers by orders from consumers requesting 2 to 3 days delivery. Demand is good for Prime Western, and information available to producers indicates that galvanizers have an order backlog of 6 months or better. Demand for Prime Western is limited only by the supply of steel available. Demand for Special High Grade continues strong but within the bounds of available supplies. It is apparent to producers that the expectations of prospective price action in zinc encouraged consumers to deplete their stocks to the point where pipelines have run dry and they are in urgent need to replenish them. With all consumers coming back into the market at the same time, it is a pressing problem for producers to meet their requirements. This is particularly true because of the shutting down of many producers in the Joplin area since the end of subsidy payments. It is also made more difficult by the shortage of freight cars. It is reported that over 6000 men are out of work in the Joplin area. Regular High Grade is the only type of zinc in easy supply. Producers are of the opinion that this is the only type that will be offered for stockpiling at the present time.

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Lead

• • • **Consumers are able** to obtain their requirements in lead but there is no surplus metal available for stockpiling. Producers are of the opinion that there will be no offerings of domestic lead to the Bureau of Federal Supply for this purpose. It is estimated that October lead is 90 pct sold. St. Joseph Lead Co. has begun to open its books for the month on the first of the preceding month. Since Oct. 1, an estimated 10 pct of November lead has been sold. Western producers are still suffering from the labor shortage and in consequence there has been no production jump in domestic operations which might have been expected at the 15¢ price. There have been no closings of lead properties because of the curtailment of subsidy payments except one small operation in the West. Imports of lead are reported to be continuing at peak volume due to the high domestic price and the low current import duty rates under the emergency extension of the Reciprocal Tariff rates. Lead producers are badly handicapped by the overall shortage of freight cars. It is reported that some 600 boxcars a day are being shipped West to hold for grain shipments.

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Scrap Market Unchanged

New York

• • • **There is little** activity in any of the scrap metals. The industry is in expectation of market developments after the meeting of the National Assn. of Waste Materials Dealers at Atlantic City early this week. Many of the major factors in the industry are now at the meeting and those not attending foresee prospects of significant developments which may grow out of it.

•

Cadmium

• • • **Cadmium continues** in short supply according to industry reports. This metal remains under export control of the Dept. of Commerce. Export requirements are screened carefully through established exporters. The price remains constant at $1.75 per lb.

Nonferrous Metals Prices

Cents per pound

	Oct. 1	Oct. 2	Oct. 3	Oct. 4	Oct. 6	Oct. 7
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$17.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$35.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$81 to $83
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$59 to $62
Silver, New York, cents per oz.	71.375
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr. per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No 115	17.50-18.00
No. 120	17.00-17.50
No. 123	16.50-17.00
80-10-10 ingot	
No. 305	21.50-22.00
No. 215	19.50-20.00
88-10-2 ingot	
No. 210	27.25-27.75
No. 215	25.75-26.25
No. 245	19.75-20.25
Yellow ingot	
No. 405	13.75-14.50
Manganese Bronze	
No. 421	15.75-16.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	14.25
No. 12 alum. (No. 2 grade)	13.75
108 alloy	14.00
195 alloy	14.75
AXS-679	14.25

Steel deoxidizing aluminum, notch-bar, granulated or shot

Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	12.75
Grade 3—90 pct-92 pct	12.00-12.25
Grade 4—85 pct-90 pct	11.50-11.75

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21: 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14½
Loose yellow brass trimmings	15½

Copper and Brass

No. 1 heavy copper and wire	15½—16
No. 2 heavy copper and wire	14½—15
Light copper	13 —13½
Auto radiators (unsweated)	8½— 9
No. 1 composition	10½—11
No. 1 composition turnings	10 —10½
Clean red car boxes	9 — 9½
Cocks and faucets	8½— 9
Mixed heavy yellow brass	6½— 7
Old rolled brass	7 — 7¼
Brass pipe	8 — 8½
New soft brass clippings	11 —11½
Brass rod ends	8½— 9
No. 1 brass rod turnings	8 — 8½

Aluminum

Alum. pistons free of struts	3½— 4
Aluminum crankcases	5½— 6
2S aluminum clippings	8 — 8½
Old sheet & utensils	5½— 6
Mixed borings and turnings	— 2
Misc. cast aluminum	5 — 5½
Dural clips (24S)	4½— 5

Zinc

New zinc clippings	5½— 6
Old zinc	4¼— 4½
Zinc routings	2½— 3
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap lead	10 —10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	6½— 7
Castings	4½— 5½

Miscellaneous

Block tin	63 —65
No. 1 pewter	48 —50
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	13 —13½
Siphon tops	38 —39
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	9½—10
New type shell cuttings	11 —11½
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

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Small Increases Feature Heavy Grades

New York

• • • **Due to the** elimination of the $37.50 bottom price at Pittsburgh, increasing the average there by 25¢, and an increase to $37.00 to $38.00 in Philadelphia amounting to an average increase of 75¢, THE IRON AGE heavy melting steel composite price is up 33¢ per ton to $38.08 this week.

There were no other increases in the top prices of heavy melting steel material in major consuming centers this week, although a $1 increase was registered in New York and the Boston market new price on No. 1 of $31.00 to $33.00. Small sales to major consuming interests in both Buffalo and Pittsburgh have furnished a pause in what has been a repeatedly stronger undertone in the market in recent weeks, while prices have been remaining quiet.

For the most part the big consumers are not in the market for any substantial tonnages. The market remains poised, awaiting buying action from the consumers. Mills generally continue to speak of full yards with pardonable pride, and declare stoutly their independence.

Railroad items continue their upward swing, with No. 1 railroad heavy melting steel now bringing $44.00 to $45.00 in Chicago, and most railroad items in Pittsburgh going up 50¢ per ton.

Short shoveling turnings made a sudden upward move in Chicago from a previous $36.00 top to a new figure of $38.50, while cast iron borings were advancing from an earlier top of $35.00 to a new top of $36.50. Long distance buying is playing an increasingly important part in the east coast market areas.

•

PITTSBURGH — Price increases were posted on almost everything but heavy melting steel here in the past week while early in the week brokers were paying $38 to cover $38 heavy melting steel orders. Signs of price strength were numerous and while $38 sales of heavy melting steel were made recently some consumers report they were unable to get any at all. Low phos sales are reported proportionally higher than normal, with prices running from $40 to $46 depending on quality and length. Loose grading on low phos appears to be definitely increasing while the quality of No. 1 steel is on the downgrade.

•

CHICAGO — The scrap market has stayed so quiet so long that many observers are finding the silence unbearable. These authorities contend that the last month's prices have not reflected the true condition of the market and they are afraid the sustained quiet conditions may erupt into an explosion. Of significance last week was the sudden increase of a mill price in two turning and boring items. The extent of the price jump was unexpected in many quarters. Railroads were still getting premium prices on practically anything they had to offer.

•

CLEVELAND—Scrap markets here and in the Valley have become rumor factories where the operating rate tops even the steel industry's. Brokers' buying prices and the consumers' efforts to land more material are the principal sources momentarily. That the market is going to go up, and at any time, is a foregone conclusion in the trade—major consumers, however, are unswerving in their determination to do everything possible to prevent it. In any event, the market will probably not go up until all the railroad lists are out of the way.

•

BOSTON—Heavy steel is generally $31, up 75¢ from last week, but when U. S. Steel and Bethlehem are not concerned price runs up to $33 for strictly No. 1. Local brokers lost out on local navy yard offerings, the bulk going to Youngstown and other outside interests who bid $29.69 for unprepared, $33.05 for No. 2 steel and $26.85 for light iron. Turnings and borings prices are a shade firmer due to a rather scant supply. Cast market also is firmer.

•

PHILADELPHIA—Brokers are paying $37 and higher for heavy melting grades, and there have been no sales to consumers during last week. Although the available tonnage is small, reports indicate that some mills are offering $1 premium for No. 1 melting. Many of the old orders have expired and shipments on the remaining ones are poor. The heavy melting market is quoted this week at $37 to $38. The Reading Co. list that closed last week brought $41.25 for heavy melting, and it is understood that one mill bid was very little below this figure. Steel wheels, couplers and knuckles brought $47.05; malleable, $58.10. Turnings have sold $1 higher than last week; low phos plate, punchings, $1.50 higher; low phos turnings, up $1. A Pittsburgh broker paid $39.11 for No. 2 heavy melting f.o.b. Aberdeen, Md. on an old order.

•

NEW YORK—Scrap prices moved up again this week with increasing competition for the material that is available. Yards remain nearly bare, and the deliveries are still scant. Shipments outside the district are slightly stronger. Prices for heavy melting steel up to $34 are being paid this week, and turning are up 50¢ per ton as well.

•

CINCINNATI—The scrap market here showed some upswing this week with prices generally strong. While foundry grades are very much in demand they are very scarce, particularly low phos and short rails. Consumers indicate that they are trying to keep prices down and are not buying any more than is absolutely necessary.

•

DETROIT—All indications point to a tightening of the scrap market here but the price line is being held. Reports indicate that a Detroit buyer has paid as high as $43 for limited tonnages of remote scrap. However, the practice of paying prices higher than the local price for very limited tonnages available in the south and southwest is a continuing one which was inaugurated many months ago. Informed sources here indicate that the tonnage involved is not large enough to establish the Detroit price although some scrap buyers agree that this may mean higher prices on the way. Despite a noticeably stronger market; price changes here this week are nominal.

•

BUFFALO—Sale of a modest tonnage of openhearth scrap to one of the leading consumers at $38 took some of the steam out of the bull movement but the undertone of the general market continued strong. Railroad specialties were boosted $4 to $5 on the basis of the latest lists, turnings and borings were lifted $1 and low phos advanced 50¢. Water shipments of scrap continued in good volume. Two barge fleets carrying 7000 tons were scheduled to arrive late this week from New York and a cargo of 5000 tons was enroute from Duluth by lake.

•

BIRMINGHAM — Prices remain unchanged in this district despite a strong market undertone. Movement of all grades is relatively slow with most material originating from the breaking up of government surplus ships at Gulf Ports. With farmers still busy with harvest, very little agricultural scrap is being received by dealers here.

•

TORONTO—Renewed interest is developing in the Canadian market. While there has been no big increase in offerings up to this time, collectors again are travelling the highways and byways in search of scrap. Local dealers state that receipts have shown some improvement in the past week or 10 days, largely due to heavier shipments from outside points. However, most of the scrap reaching the market is still from industrial plants.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00
RR. hvy. melting	$41.50 to 42.00
No. 2 hvy. melting	38.00
RR. scrap rails	46.00 to 47.00
Rails 2 ft. and under	49.00 to 49.50
No. 1 comp'd bundles	38.00
Hand bdld. new shts.	38.00
Hvy. axle turn.	37.00 to 37.50
Hvy. steel forge turn.	37.00 to 37.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	34.00 to 35.00
Mixed bor. and turn.	33.00 to 33.50
Cast iron borings	33.00 to 34.00
No. 1 cupola cast.	43.50 to 44.50
Hvy. breakable cast	37.50 to 38.00
Malleable	53.00 to 55.00
RR. knuck. and coup.	48.00 to 49.00
RR. coil springs	48.00 to 49.00
RR. leaf springs	48.00 to 49.00
Rolled steel wheels	48.00 to 49.00
Low phos.	45.00 to 46.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	38.50 to 39.00
No. 1 bundles	38.50 to 39.00
No. 2 dealers' bundles	38.50 to 39.00
Bundled mach. shop turn.	38.50 to 39.00
Galv. bundles	36.50 to 37.00
Mach. shop turn.	33.50 to 34.00
Short shov. turn.	38.00 to 38.50
Cast iron borings	36.00 to 36.50
Mix. borings & turn.	33.50 to 34.00
Low phos, hvy. forge.	45.00 to 46.00
Low phos, plates	42.00 to 42.50
No. 1 RR. hvy. melt.	44.00 to 45.00
Rerolling rails	52.00 to 53.00
Miscellaneous rails	47.00 to 48.00
Angles & splice bars	49.00 to 49.50
Locomotive tires, cut	47.00 to 47.50
Cut bolster & side frames	47.00 to 48.00
Standard stl. car axles	55.00 to 55.50
No. 3 steel wheels	47.00 to 47.50
Couplers & knuckles	46.50 to 47.00
Rails 2 ft. and under	51.00 to 52.00
Malleable	61.00 to 62.00
No. 1 mach. cast.	48.00 to 50.00
No. 1 agricul. cast.	46.00 to 47.00
Hvy. breakable cast.	40.00 to 41.00
RR. grate bars	43.50 to 44.00
Cast iron brake shoes	45.00 to 45.50
Cast iron carwheels	45.00 to 45.50

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	39.00 to 40.00
Mach. shop turn.	29.50 to 30.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.00 to 30.00
Low phos. plate	40.00 to 41.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	36.00 to 37.00
Scrap rails	40.00 to 41.00

BOSTON

Dealers' buying prices per gross ton. f.o.b. cars:

No. 1 hvy. melting	$31.00 to $33.00
No. 2 hvy. melting	31.00
Nos. 1 and 2 bundles	31.00
Busheling	31.00
Shoveling turn.	27.50 to 28.00
Machine shop turn.	25.50 to 26.00
Mixed bor. & turn.	25.50 to 26.00
Cl'n cast. chem. bor	29.00
No. 1 machinery cast.	37.00 to 40.00
No. 2 machinery cast.	36.00 to 39.00
Heavy breakable cast	37.00 to 39.00
Stove plate	36.00 to 37.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$34.25 to $35.25
No. 2 hvy. melting	34.25 to 35.25
No. 1 bundles	34.25 to 35.25
New busheling	34.25 to 35.25
Flashings	34.25 to 35.25
Mach. shop turn.	27.00 to 28.00
Shoveling turn.	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Mixed bor. & turn.	28.00 to 29.00
Low phos. plate	38.25 to 39.25
No. 1 cupola cast	42.00 to 43.00
Hvy. breakable cast	33.00 to 34.00
Stove plate	32.00 to 34.00
Automotive cast.	38.00 to 40.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
Mach. shop turn.	30.50 to 31.50
Shoveling turn.	30.50 to 31.50
Mixed bor. & turn.	30.50 to 31.50
Clean cast chemical bor.	35.00 to 36.50
No. 1 machinery cast.	48.00 to 49.00
No. 1 mixed yard cast.	45.00 to 46.00
Hvy. breakable cast.	46.00 to 47.00
Cast. charging box	46.00 to 47.00
Clean auto cast.	45.00 to 46.00
Hvy. axle forge turn.	39.00 to 40.00
Low phos. plate	43.50 to 44.50
Low phos. punchings	43.50 to 44.50
Low phos. bundles	41.00 to 42.00
RR. steel wheels	46.00 to 47.00
RR. coil springs	46.00 to 47.00
RR. malleable	58.00 to 60.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.23
Bundled sheets	35.23
Mach. shop turn.	26.00 to 27.00
Locomotive tires, uncut	42.00 to 43.00
Mis. std. sec. rails	43.00 to 44.00
Rerolling rails	46.50 to 47.50
Steel angle bars	44.00 to 45.00
Rails 3 ft. and under	46.00 to 47.00
RR. steel springs	45.00 to 46.00
Steel car axles	45.00 to 46.00
Grate bars	37.00 to 38.00
Brake shoes	39.00 to 40.00
Malleable	59.00 to 61.00
Cast iron car wheels	42.50 to 43.50
No. 1 machinery cast	43.00 to 44.00
Hvy. breakable cast	38.00 to 39.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	34.00 to 35.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	34.00 to 35.00
Long turnings	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	24.00 to 25.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	44.00 to 45.00
Stove plate	42.00 to 42.50
No. 1 RR. hvy. melt.	36.00 to 37.00
Steel axles	38.00 to 39.00
Scrap rails	37.50 to 38.00
Rerolling rails	41.00 to 42.00
Angles & splice bars	40.00 to 41.00
Rails 3 ft. & under	40.00 to 41.00
Cast iron carwheels	35.00 to 36.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
Mach. shop turn.	33.00 to 34.00
Short shov. turn.	34.00 to 35.00
Cast iron borings	33.00 to 34.00
Low phos.	44.00 to 45.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 bundles	33.00 to 34.00
Comp. galv. bundles	31.00
Mach. shop turn.	26.50 to 27.50
Mixed bor. & turn.	26.50 to 27.50
Shoveling turn.	28.00 to 29.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	40.00 to 41.00
Charging box cast.	40.00 to 41.00
Stove plate	40.00 to 41.00
Clean auto cast.	40.00 to 41.00
Unstrip. motor blks.	36.50 to 37.50
Cl'n chem. cast bor.	28.00 to 28.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	37.00 to 38.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
No. 1 cupola cast.	40.00 to 42.00
Charging box cast.	36.00 to 38.00
Stove plate	39.00 to 40.00
Clean auto cast.	40.00 to 42.00
Small indl. malleable	39.00 to 41.00
RR. malleable	50.00 to 55.00
Low phos. plate	42.50 to 43.50
Scrap rails	40.00 to 41.00
Rails 3 ft. & under	45.00 to 46.00
RR. steel wheels	46.00 to 48.00
Cast iron carwhels	46.00 to 48.00
RR. coil & leaf spgs.	46.00 to 48.00
RR. knuckles & coup.	46.00 to 48.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $38.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 bundles	38.00 to 38.50
No. 2 bundles	38.00 to 38.50
No. 1 busheling	38.00 to 38.50
Drop forge flashings	38.00 to 38.50
Mach. shop turn.	31.50 to 32.00
Shoveling turn.	32.50 to 33.00
Steel axle turn.	38.00 to 38.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	32.50 to 33.00
Low phos.	41.00 to 42.00
No. 1 machinery cast.	47.00 to 47.50
Malleable	55.00 to 60.00
RR. Cast.	47.00 to 47.50
Railroad grate bars	42.00 to 44.00
Stove plate	42.00 to 44.00
RR. hvy. melting	40.50 to 41.00
Rails 3 ft. & under	47.00 to 48.00
Rails 18 in. & under	48.00 to 49.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	22.00
No. 2 bales	22.00

Per gross ton delivered to consumer

No. 3 bales	$16.50
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	26.00
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50
No. 2 hvy. melting	22.50
No. 1 bales	22.50
No. 2 bales	22.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast.	$32.00 to 33.00
RR. hvy. melting	23.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy, melt.	$22.00 to $24.00
Elec. furn. 1 ft. and und.	27.00 to 28.50
No. 1 cupola cast.	30.00
RR. hvy. melting	23.00 to 25.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact., prep'd	21.00*
Bushelings, new fact., unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	36.00 to 40.00

*Ceiling Price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

	Oct. 7, 1947	Sept. 30, 1947	Sept. 9, 1947	Oct. 8, 1946
Flat-Rolled Steel: (cents per pound)				
Hot-rolled sheets	2.80	2.80	2.80	2.425
Cold-rolled sheets	3.55	3.55	3.55	3.275
Galvanized sheets (10 ga.)	3.95	3.95	3.95	4.05*
Hot-rolled strip	2.80	2.80	2.80	2.45
Cold-rolled strip	3.55	3.55	3.55	3.05
Plates	2.95	2.95	2.95	2.50
Plates wrought iron.....	6.85	6.85	6.85	4.112
Stain's c-r strip (No. 302)	30.30	30.30	30.30	30.30
*24 gage				
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.50
Cold-finished bars	3.55	3.55	3.55	3.10
Alloy bars	3.30	3.30	3.30	2.92
Structural shapes	2.80	2.80	2.80	2.35
Stainless bars (No. 302).	26.00	26.00	26.00	25.97
Wrought iron bars......	7.15	7.15	7.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.05
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$39.00
Sheet bars	66.00	66.00	66.00	38.00
Slabs, rerolling	45.00	45.00	45.00	39.00
Forging Billets	55.00	55.00	55.00	47.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.30
Skelp	2.60	2.60	2.60	2.05

Pig Iron: (per gross ton)	Oct. 7, 1947	Sept. 30, 1947	Sept. 9, 1947	Oct. 8, 1946
No. 2, foundry, Phila.....	$41.22	$41.22	$41.22	$30.43
No. 2, Valley furnace....	36.50	36.50	36.50	28.50
No. 2, Southern Cin'ti...	39.75	39.75	39.75	27.80
No. 2, Birmingham	34.88	34.88	34.88	24.88
No. 2, foundry, Chicago†	36.00	36.00	36.00	28.50
Basic del'd Philadelphia.	40.72	40.72	40.72	29.93
Basic, Valley furnace	36.00	36.00	36.00	28.00
Malleable, Chicago†	36.50	36.50	36.50	28.50
Malleable, Valley	36.50	36.50	36.50	28.50
Charcoal, Chicago	49.49	49.49	49.49	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

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† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ For carlots at seaboard.

	Oct. 7, 1947	Sept. 30, 1947	Sept. 9, 1947	Oct. 8, 1946
Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$38.00	$37.75	$37.75	$20.00
Heavy melt'g steel, Phila.	37.50	36.75	36.75	18.75
Heavy melt'g steel, Ch'go	38.75	38.75	38.75	18.75
No. 1, hy. comp. sheet, Det.	34.50	34.50	34.50	17.32
Low phos. Youngs'n	44.50	44.50	44.50	22.50
No. 1, cast, Pittsburgh...	43.00	43.00	43.00	25.00
No. 1, cast, Philadelphia.	47.50	47.50	47.00	25.00
No. 1, cast, Chicago.....	49.50	49.50	49.50	25.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt...	$12.00	$12.00	$12.00	$8.75
Foundry coke, prompt...	13.75	13.75	13.75	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn...	21.50	21.50	21.50	14.375
Copper, Lake, Conn.....	21.625	21.625	21.625	14.375
Tin, Straits, New York..	80.00	80.00	80.00	52.00
Zinc, East St. Louis.....	10.50	10.50	10.50	8.25
Lead, St. Louis.........	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex..	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Oct. 7, 1947	3.19141¢ per lb	$36.93 per gross ton	$38.08 per gross ton
One week ago	3.19141¢ per lb	$36.93 per gross ton	$37.75 per gross ton
One month ago	3.19141¢ per lb	$36.93 per gross ton	37.75 per gross ton
One year ago	2.73011¢ per lb	$28.13 per gross ton	**$19.17** per gross ton

	FINISHED STEEL		PIG IRON		SCRAP STEEL	
	HIGH	LOW	HIGH	LOW	HIGH	LOW
1947....	3.19141¢ Aug. 5	2.87118¢ Jan. 7	$37.35 Aug. 19	$30.14 Jan. 7	$41.67 Aug. 5	$29.50 May 20
1946....	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945....	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944....	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943....	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942....	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941....	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939....	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935....	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934....	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933....	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932....	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931....	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930....	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929....	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

—Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices: includes 3 pct freight tax. (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Spot market as high as $92 gross ton. (17) Delivered Los Angeles: add ½c per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $2 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (23) 0.10¢ less, (24) 0.20¢ less.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO		
													Detroit	New York	Philadelphia
INGOTS Carbon, rerolling					($36.00 f. o. b. mill) (Spot market as high as $80 gross ton)										
Carbon, forging	$46.00														
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]							$48.00[19]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.00		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)						$69.00		
SHEET BARS[16]							$66.00								
PIPE SKELP	2.60¢[21]	2.65¢					2.60¢[21]	2.60¢[21]							
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester = 2.90¢[21])					3.52¢[13]			
SHEETS Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	3.175¢	(Ashland, Ky. = 2.80¢)		3.54[17]¢	2.95¢	3.09¢	3.00¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.70¢	3.96¢	3.93¢
Galvanized (10 gage)	3.95¢[23]	3.95¢[23]	3.95¢[23]		3.95¢[23]		3.95¢	3.95¢	4.05¢	3.95 ¢	(Ashland =3.95¢)	4.62¢[17]		4.14¢	4.05¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.10¢[22]	4.38¢	4.33¢
Long ternes [2] (10 gage)	4.05¢[24]	4.05¢[24]	3.85¢											4.45¢	4.41¢
STRIP Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[17]	2.95¢	3.23¢	3.18¢
Cold-rolled [4]	3.55¢	3.65¢		3.55¢			3.55¢			(Worcester = 3.75¢)			3.70¢	3.98¢	3.93¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.39¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio = $5.75)			$6.175	$6.062[11]
Electro, box 0.25 lb. 0.50 lb. 0.75 lb.						Deduct 90¢ from standard coke base box price. Deduct 70¢ from standard coke base box price. Deduct 50¢ from standard coke base box price.									
BLACKPLATE, 29 gage[5]	3.90¢	3.90¢	3.90¢		4.00¢			4.00¢	4.00¢					4.29¢	4.20¢
BLACKPLATE, CANMAKING 55 lb. to 70 lb. 75 lb. to 95 lb. 100 lb. to 118 lb.						Deduct $1.55 from standard coke base box. Deduct $1.65 from standard coke base box. Deduct $1.55 from standard coke base box.									
TERNES, MFG., Special coated						Deduct 85¢ from standard coke base box price.									
BARS Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[17]	3.05¢	3.31¢	3.28¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[17]		3.04¢	2.95¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.70¢	3.96¢	3.93¢
Alloy, hot-rolled	3.30¢	3.30¢				3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)					3.45¢		3.44¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢							4.25¢		
PLATE Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	(Coatesville = 3.15¢, Claymont = 3.15¢, Geneva, Utah = 3.125¢) 2.95¢				3.76¢[14]		3.24¢	3.15¢
Floor plates	4.20¢	4.20¢												4.60¢	4.58¢
Alloy	3.80¢	3.80¢			(Coatesville = 4.50¢)									4.02¢	3.895¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.975¢, Bethlehem = 2.80¢)					3.43¢[10]		3.00¢	2.94¢
SPRING STEEL, C-R 0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester = 3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester = 4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester = 5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester = 7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester = 9.30¢)								
MANUFACTURERS' WIRE[9] Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		3.96¢	3.93¢
Galvanized					Add proper size extra and galvanizing extra to Bright Wire Base										
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢)				(Trenton = 4.85¢)			5.28¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.71¢	3.88¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation		Subject to negotiation			
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation		Subject to negotiation			
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	*Cr*	*V*	*Mo*	*Co*	*Base Per lb*
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢
High-carbon-chromium*					47¢
Oil hardening manganese*					26¢
Special carbon*					24¢
Extra carbon*					20¢
Regular carbon*					17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.25
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45
	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.05¢
Tie plates, Fittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio; Weirton, W. Va.; St. Louis, Kansas City, Minnequa, Colo.; Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	*Plate*	*Sheet*
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

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* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	*Delivered San Francisco*
Standard & coated nails	$4.25†	$5.33
Galvanized nails‡‡	4.00†	5.08
Cut nails, carloads, Pittsburgh base	5.80*	....

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† 10¢ additional at Cleveland, 35¢ at Worcester. ‡‡ Plus $2.75 per 100 lb galvanizing extra. *Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base	*column*
Woven wire fence*	91	114
Fence posts, carloads	90††	...
Single loop bale ties	91	115
Galvanized barbed wire**	101	121
Twisted barbless wire	101	...

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* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4 30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.85	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Cold-rolled	....	....	....	....	....	....	....	....	....
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv,
½-in.	50½	34½
¾-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in,	58	43½
Wrought Iron, buttweld		
½-in.	+ 7	+29
¾-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
½-in.	49½	35
¾-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
½-in.	+ 2½	+23
¾-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

		Seamless		Electric Weld	
OD in in.	Gage BWG	Hot-Rolled	Cold-Drawn	Hot-Rolled	Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$85.06
6-in. to 24-in. del'd New York	83.30
6-in. to 24-in., Birmingham	74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	98.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter	45
9/16 & ⅝ in. x 6 in. & shorter	46
¾ in. & larger x 6 in. & shorter	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long	44
Lag, all diam x 6 in. & shorter	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	43
9/16 to 1 in. inclusive	42
1⅛ to 1½ in. inclusive	40
1⅝ in. and larger	35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller		46
½ in. and smaller	44	..
½ in. through 1 in.		44
9/16 in. through 1 in.	43	..
1⅛ in. through 1½ in.	41	42
1⅝ in and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate	65 and 10
In bulk	75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets (7/16 *in. and smaller)*

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55

Cap and Set Screws

(In packages)	*Percent Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
⅝ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, cup and oval points	61
Milled studs	43
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports)*

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 17¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 32¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200, & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	49¢
Nickel, 100 mesh	51½¢
Silicon, 100 mesh	26¢
Solder powder, 100 mesh	8½¢ plus metal
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	$3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$11.50 to $12.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.00 to 14.50
Foundry, Byproduct	
Chicago, del'd	$17.10
Chicago, f.o.b.	16.10
New England, del'd	19.50
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	16.75
Swedeland, Pa., f.o.b.	16.75
Buffalo, del'd	18.25
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	16.75
Cleveland, del'd	17.90
Cincinnati, del'd	15.39
St. Louis, del'd	18.03
Birmingham, del'd	15.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
No. 1, Ohio	$64.00
First quality, Pa., Md., Ky., Mo., Ohio	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo, Ohio	64.00
Sec. quality, New Jersey	59.00
No. 2, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District and Alabama	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest: add 10¢; Missouri Valley; add 20¢	$11.05

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.44	$5.18	$5.69	$4.73	$5.28	$4.79	$4.52	$4.78	$5.48	$8.32	$8.42	$9.83	$9.93
New York	4.67	5.67[1]	6.07	4.97	5.80	5.02	4.72	4.97	5.52	8.37	8.47	9.87	9.97
Boston	4.70	5.57[12]	5.50[12]	4.70	6.71	5.05	4.77	4.92	5.57	8.57	8.67	9.92	10.02
Baltimore	4.29	....	5.54	4.70	....	4.74	4.64	4.75	5.45	....	....	....	....
Norfolk	4.75	....	....	5.15	....	5.00	5.00	5.05	5.85	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Milwaukee	4.399	5.249[1]	5.799	4.499	5.599	4.749	4.549	4.549	5.249	8.349	8.449	9.599	9.699
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.95	8.308	8.408	9.30	9.40
Buffalo	4.25	5.10	5.95	4.65	5.61[5]	4.90	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	5.97	4.64	5.59	4.84†	4.72	4.50	5.22	8.46	8.56	9.69	9.79
Cincinnati	4.471	5.166	5.166	4.694	....	4.903	4.744	4.708	5.403	....	....	....	....
St. Louis	4.549	5.399[1]	5.974	4.649	5.774	4.899	4.699	4.699	5.424	8.524	8.624	9.774	9.874
Pittsburgh	4.25	5.10[1]	5.65	4.35	4.95	4.60	4.40	4.40	4.95	8.05	8.15	9.30	9.40
St. Paul	4.584[7]	5.434[1]	5.834[2]	4.684[7]	....	4.884[7]	4.734[7]	4.734[7]	4.826[6]	....	....	....	....
Omaha	4.868	6.118[1]	6.468	5.168	....	5.418	5.218	5.218	5.918	....	....	....	....
Indianapolis	4.51	5.29	5.84	4.61	5.46	4.86	4.66	4.65	5.36	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	5.93	....	....	....	....
Memphis	4.77[11]	5.79[11]	6.37	4.97[11]	....	5.12[11]	4.92[11]	4.92[11]	5.79	....	....	....	....
New Orleans	*4.98[11]	6.29[1]	....	5.18[11]	....	5.33[11]	*5.03[11]	*5.13[11]	6.29[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.60	8.75[16]	8.55[16]	9.70[16]	9.80[16]
Los Angeles	5.65	7.35[1]	7.30	5.95	8.70[5]	5.40	5.25	5.40	7.25[14]	9.90[15]	9.60[15]	11.35[15]	11.35[1]
San Francisco	5.20[8]	6.65	6.85	5.50[8]	....	5.30	5.20	5.05	7.35[10]	....	....	....	....
Seattle	5.30[4]	7.10[2]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.45[4]	7.45[14]	....	9.75[6]	....	11.10[6]
Portland	5.30[4]	....	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.25	....	7.50	6.75	....	6.10	6.25	6.35	7.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	.....
Birdsboro	40.00	40.50	41.00	41.50	45.00
Birmingham	32.88-35.88	33.38-36.38	.....	.....	.....
Buffalo	36.00-37.50*	36.00-38.00*	36.50-38.50*	.....	.....
Chicago	35.50	36.00	36.50	37.00	.....
Cleveland	35.50-38.25*	36.00-38.75*	36.50-39.25*	.....	.....
Duluth	36.00	36.50	37.00	37.50	.....
Erie	35.50	36.00	36.50	37.00	.....
Everett	.....	45.00	45.50	.....	.....
Granite City	36.50	37.00	37.00	.....	.....
Neville Island	36.00	36.50	36.50	37.00	.....
Provo	37.00	37.50	.....	.....	.....
Sharpsville	36.00	36.50	36.50	37.00	.....
Steelton	37.00	.....	.....	.....	42.00
Struthers, Ohio	36.50	.....	.....	.....	.....
Swedeland	41.00	41.50	42.00	42.50	.....
Toledo	35.50	36.00	36.50	37.00	.....
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00
Youngstown	36.00	36.50	36.50	37.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Boston	Steelton	4.82	.....	.....	.....	.....	46.82
Brooklyn	Bethlehem	3.00	40.00	40.50	41.00	41.50	.....
Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	48.50
Cincinnati	Birmingham	4.87	37.75-40.75	38.25-41.25	.....	.....	.....
Jersey City	Bethlehem	1.84	38.84	39.34	39.84	40.34	.....
Jersey City	Birdsboro	2.33	.....	.....	.....	.....	47.33
Los Angeles	Provo	5.94	42.94	43.44	.....	.....	.....
Mansfield	Cleveland-Toledo	2.33	37.83-40.58*	38.33-41.08*	38.83-41.58*	39.33	.....
Philadelphia	Bethlehem	1.67	38.67	39.17	39.67	40.17	.....
Philadelphia	Swedeland	1.01	42.01	42.51	43 01	43.51	.....
Philadelphia	Birdsboro	1.49	41.49	41.99	42.49	42.99	46.49
Philadelphia	Steelton	2.16	39.16	.....	.....	.....	44.16
San Francisco	Provo	5.94	42.94	43.44	.....	.....	.....
Seattle	Provo	5.94	42.94	43.44	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	37.25	37.75	37.75	.....	.....

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* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$45.50; f.o.b. Buffalo — $46.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $44.00 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $49.49. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$145
Less ton lots (packed)	172.00
Delivered Pittsburgh	151.00

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	8.00	8.25	8.80
Ton lots	9.00	9.60	11.50
Less ton lots	9.40	10.00	11.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C. 0.06% P, 90% Mn	23.00	24.10	24.70
0.10% max. C	22.50	23.60	24.20
0.15% max. C	22.00	23.10	23.70
0.30% max. C	21.50	22.60	23.20
0.50% max. C	21.00	22.10	22.70
0.75% max. C, 7.00% max. Si	18.00	19.10	19.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	7.40
Ton lots	8.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	7.65
Ton lots	8.65
Less ton lots	9.05

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $73.00 f.o.b. Keokuk, Iowa; $73.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	18.50	19.85	21.60
97% Si, 1% Fe	18.00	20.25	22.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.80	5.05	5.25
Ton lots	5.80	6.40	6.70
Less ton lots	6.20	6.80	7.10

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.00	15.65	15.90
50% Si	8.80	9.30	9.50
75% Si	11.20	11.50	12.25
80-90% Si	12.70	13.00	13.75
90-95% Si	14.35	14.65	15.35

Ferrochrome (65-72%*Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	25.00	25.40	26.00
0.10% C	24.50	24.90	25.50
0.15% C	24.00	24.40	25.00
0.20% C	23.75	24.15	24.25
0.50% C	23.50	23.90	24.00
1.00% C	23.00	23.40	23.50
2.00% C	22.50	22.90	23.00
65-69% Cr, 4.9% C	17.60	18.00	18.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	11.10	11.35	11.45
Ton lots	12.00	12.90	13.50
Less ton lots	12.40	13.30	13.90

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	18.70	19.10	19.25
Ton lots	19.90	21.20	22.00
Less ton lots	20.60	21.90	22.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	23.00	23.40	23.50
Ton lots	24.35	25.00	26.20
Less ton lots	25.35	26.00	27.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	91.00	92.50	93.75
0.50% max. C	87.00	88.50	89.75
9.00% min. C	87.50	89.00	91.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.35	20.50
Less ton lots	18.60	19.35	21.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	16.75	17.25	19.30
Ton lots	18.85	19.70	21.45
Less ton lots	19.85	20.70	22.45

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.85	$2.70	$3.40
Less ton lots	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr. 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	17.25	18.35	20.30
Less ton lots	18.00	19.10	21.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.05	16.15	18.10
Less ton lots	15.80	16.90	18.85

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.50
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2 A_5	$1.20
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	18.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Ft, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.50¢
Ton lots	7.00¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17-50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$1.80	$1.8125	$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.	
Carload lots	37.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.	
Ton lots, per pound	8.0¢